| Phase | Type |
|---|---|
| Initial Site Investigation | Work Scope |
| **X Corrective Action Feasibility Investigation** | **X Technical Report** |
| Corrective Action Plan | PCF Reimbursement Request |
| Corrective Action Summary Report | General Correspondence |
| Operations and Monitoring Report | |

# Corrective Action Feasibility Investigation and Site Monitoring Report

**Northern Petroleum Bulk Storage Facility**
**521 Bay Street**
**St. Johnsbury, Vermont**

SMS Site #2005-3397

*for*

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# EXECUTIVE SUMMARY

This Corrective Action Feasibility Investigation (CAFI) and Site Monitoring Report was prepared by Environmental Compliance Services, Inc. (ECS) of Richmond, VT on behalf of Bradford Oil Company, Inc. of Bradford, VT to evaluate remedial alternatives at the Northern Petroleum Bulk Storage Facility (Site #2005-3397), located at 521 Bay Street in St. Johnsbury, Vermont (hereafter referred as the "Site"). ECS's findings are summarized as follows:

- Recoverable amounts of light non-aqueous phase liquid (LNAPL) were detected in four wells in the southeastern corner and eastern side of the site. LNAPL was measured in on-site wells MW-12 and MW-22, off-site upgradient well MW-28, and off-site downgradient well MW-7, at thicknesses ranging from 0.13 feet to 1.36 feet. Estimated actual LNAPL thickness ranged from 0.01 feet to 0.03 feet. The presence of LNAPL, identified as gasoline, in off-site upgradient well MW-28 suggests an off-site source of contamination migrating onto the site.

- LNAPL bail-down testing was conducted at one week intervals for four weeks. LNAPL thickness decreased with each removal event in most wells.

- Vermont Groundwater Enforcement Standards (VGES) were exceeded for one or more petroleum hydrocarbons in samples collected from eleven monitoring wells, including offsite downgradient well MW-8. Total benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations in these eleven samples ranged from 5.0 micrograms per liter (µg/L) in MW-8 to 7,961 µg/L in upgradient onsite well MW-17. The presence of dissolved-phase petroleum contamination in upgradient MW-17 is likely from an off-site source. BTEX concentrations in most wells increased since the previous February 2006 sampling event.

- The gasoline additive methyl tert-butyl ether (MTBE) was detected in eight wells located throughout the site at concentrations ranging from 3.3 µg/L in MW-31 to 5,620 µg/L in MW-1. This is generally consistent with the data collected during the initial site investigation; however, MTBE was detected in off-site wells MW-29 and MW-30 located on the former Ralston Purina property for the first time since sampling began in July 2005.

- No petroleum volatile organic compounds (VOCs) were detected in off-site wells MW-1R, MW-26, MW-27, MW-32 or MW-101.

- Groundwater in the unconfined surficial aquifer at the site appears to flow generally southeast toward the Passumpsic River, which is consistent with previous data. However, there appears to be anomalous groundwater elevations in the southeastern corner of the site in the vicinity of the tank farm. The cause of the lower groundwater elevations is unknown, but it may be hindering off-site migration based on contaminant concentrations in downgradient off-site monitoring wells MW-29 through MW-32. Gradients may vary in this location due to geologic factors such as subsurface gravel layers and slightly finer-grained soils in downgradient soil borings MW-29 through MW-32.

Based upon our current understanding of the Site conditions, the results of the bail-down testing, and this remedial alternative screening using the Federal Remediation Technologies Screening Matrix and Reference Guide, ECS recommends that LNAPL removal with passive bailers be conducted in the vicinity of the southeastern plume. Additional monitoring wells are recommended to delineate the full extent of free product and facilitate LNAPL recovery. Paving would enhance the LNAPL removal efforts by minimizing contaminant migration and reducing solubilization of LNAPL in the unsaturated zone at this site. Based on the results of previous investigations and the likely presence of an upgradient contaminant source, a more aggressive remedial approach in the vicinity of the southeastern plume may

exacerbate the migration of contamination onto the Northern Petroleum site. It is the opinion of ECS that site closure not be contingent on contamination migrating onto the site in the northwestern portion of the property from potential off-site sources.

# 1.0 INTRODUCTION

This Corrective Action Feasibility Investigation (CAFI) and Site Monitoring report has been prepared by Environmental Compliance Services, Inc. (ECS) of Richmond, VT on behalf of Bradford Oil Company, Inc. of Bradford, VT to evaluate remedial alternatives at the Northern Petroleum Bulk Storage Facility (Site #2005-3397), located at 521 Bay Street in St. Johnsbury, Vermont (Figures 1 & 1a). The CAFI was determined to be necessary to select a remedial alternative to eliminate light non-aqueous phase liquid (LNAPL) and expedite site closure. Preparation of the CAFI was approved by the Sites Management Section (SMS) of the Vermont Department of Environmental Conservation (VTDEC) in a letter dated 13 July 2006.

The purpose of this CAFI is to evaluate, identify, and select the corrective action(s) best suited to the conditions at the Northern Petroleum Bulk Storage Facility (the Site). The objectives of the corrective action(s) are to reduce volatile organic compound (VOC) contamination in soil and groundwater resulting from petroleum releases associated with a multiple-decade history of petroleum bulk storage on the Site. No sensitive receptors have been impacted by this contamination. The remedial goals for the Site are to eliminate LNAPL and mitigate contaminant migration. Vermont Groundwater Enforcement Standards (VGES) must be achieved at the property boundary in order to reach Site closure, as well as other conditions specified in the Sites Management Activity Completed (SMAC) Designation Procedures Manual (October 2001).

The scope of work included sampling groundwater monitoring wells, conducting bail-down tests on monitoring wells containing LNAPL, and evaluating remedial technologies that would be suitable for the Site.

# 2.0 SITE HISTORY

The site currently operates primarily as a bulk oil storage facility, with a small area in the northern portion of the site used for parking by a local bus shuttle service headquartered on adjacent property north of the site. The property includes two buildings currently used as an office building and storage garage for Northern Petroleum. The property also houses a propane cylinder and tank storage area and associated facility parking areas. The ground surface throughout the site is gravel. Stormwater appears to flow to the southeastern corner of the site and ponds near the outside of the bulk storage tank farm. A site plan is shown in Figure 2.

The bulk oil storage facilities include gasoline, diesel, kerosene and #2 fuel oil stored in aboveground storage tanks (ASTs) with a total capacity of approximately 130,000 gallons, all of which are located within an earthen bermed enclosure in the southeastern corner of the site. The base of the berm is composed of six inches of compacted clay. Oil from the bulk tanks is piped underground to a fueling rack located approximately 40 feet north of the tanks. Northern Petroleum personnel were unable to confirm whether or not buried piping leading from the ASTs to the loading rack is provided with secondary containment.

One 500-gallon underground storage tank (UST), used to store #2 heating oil for on-site use, is reportedly currently located south of the office building. A former 1,000-gallon UST used to store #2 fuel oil was reportedly located at the storage garage.

The site has been used for bulk petroleum storage for several decades, during which time at least three different bulk petroleum facilities have operated at the site. Since 1990, the site has been operated as a Northern Petroleum bulk storage facility. In 1990, the current generation of ASTs were reportedly moved to the site from a Northern Petroleum property located at 590 Bay Street. According to the Spill Prevention, Control, and Countermeasures (SPCC) Plan for the site, the current generation of onsite ASTs were originally constructed in 1953 (four tanks) and 1962 (two tanks).

For an unknown period prior to 1990, the site was operated as a petroleum bulk storage facility by Menut & Parks. Another petroleum bulk storage operation reportedly preceded the Menut & Parks business. Aerial photographs dated 1962, 1974, and 1983 illustrate four apparent horizontal bulk storage ASTs located in the northeastern portion of the property, and three apparent vertical bulk storage tanks in the east-center portion of the site. Available Sanborn maps for St. Johnsbury did not include coverage of the site to confirm the history of the site in the late 1980s to early 1990s.

An initial site investigation (ISI) was completed by ECS in December 2005, which included a historical review of the site and nearby properties, a site inspection, drilling of 32 soil borings and the subsequent installation of 21 monitoring wells, and a sensitive receptor survey. The ISI concluded that soil and groundwater at the site have been impacted with petroleum-related volatile organic compounds (VOCs) associated with both on-site and off-site sources. Although the preliminary investigation disclosed several potential on-site and off-site sources, no obvious source or sources were identified.

Petroleum contamination appears to have migrated onto the site from one or more upgradient off-site sources. LNAPL, identified as gasoline, was detected on the western side of Bay Street, upgradient of the site. This location is approximately 40 feet north of an existing well on the Lewis Oil bulk storage plant. The source of this LNAPL is unknown, but likely originated from a source other than the Northern Petroleum bulk plant. The upgradient extent of groundwater contamination in this area has not been defined. ECS recommended additional groundwater monitoring, as well as an evaluation of underground utilities that may be acting as a preferential pathway for contaminant migration.

Additional site monitoring and soil survey along Bay Street was completed by ECS in April 2006. Recoverable amounts of LNAPL were detected in four wells at the site. No underground utilities were found to exist along Bay Street adjacent to the site.

Several nearby properties are listed as active or closed hazardous waste sites (Figure 1a). The Lewis Oil site, located adjacent to the Site across Bay Street, has reportedly served as a bulk oil storage facility for over 50 years. Prior to 1990, fuel was offloaded by rail car at a rack located approximately 80 feet west (upgradient) of the site. In a Phase II report conducted for the former Canadian Pacific Railway, approximately 120 cubic yards of petroleum-contaminated soil were reportedly excavated and stockpiled on the Lewis Oil site in 1990 (Tewhey, 1998). According to the VT DEC spill sites list, approximately 200 gallons of #2 fuel oil was released in January 1999 due to a tank overfill. The spills database indicated that Twin State Environmental provided clean up and the spill site was subsequently closed in February 1999.

A lubricating oil business has occupied the former Northern Petroleum Bulk Storage/office site for approximately 25 years. The former Northern Petroleum Bulk Storage/office site is located north of the site (Figure 1a).

The former Canadian Pacific Railway property has operated as a rail yard facility since the 1850s. The central portion of the rail yard formerly included fueling operations in the 1960s, approximately 600 feet northwest of the site (Tewhey, 1998).

# 3.0 CONCEPTUAL SITE MODEL

The site and limited portions of adjacent property to the east and west have been impacted by two or more petroleum contaminants including #2 fuel oil, gasoline, and possibly a third unidentified oil. Contaminant distribution and historical information indicates that the contamination likely originated from multiple sources. No obvious onsite sources, such as a leaking storage tank or spills, have been documented. Two contaminant plumes have been identified and are described below. Groundwater in the unconfined surficial aquifer appears to flow generally southeast toward the Passumpsic River.

## 3.1 NORTHWESTERN PLUME

The northwestern plume is the larger of the two and is defined by three areas of free product detected in MW-22 and MW-28 (also detected in MW-17 and MW-19 in previous investigations). The outer limits are delineated by reduced VOC concentrations in wells and/or relatively low PID readings in soil borings around the northern, eastern, and southern perimeters. The western extent of this plume, beyond MW-28, has not been defined.

Data collected to date suggest that a release related to the former bulk storage tanks may have contributed to the contamination in this portion of the site, but an offsite source west (upgradient) of MW-28 also is considered likely. LNAPL in upgradient monitoring well MW-28 was identified by the analytical laboratory as gasoline. No. 2 fuel oil was identified in soils above the water table in MW-1, and estimated to be present in MW-2 ECS, MW-17 and MW-18 in soil both above and below the water table. Other oil, (which may include lubricating, cutting, and/or silicon oil) was also identified above the water table in MW-2 ECS. No. 2 fuel oil and gasoline were detected in groundwater in these wells. Subsurface soils in this area generally consist of a fine to medium sand upper layer with underlying coarse sand and gravels. In all soil borings, the top of the water table is within the finer sands. PID readings in soil borings indicate that the vertical extent of contamination extends into the underlying coarse sand and gravel, where present. PID readings at six soil boring locations increase with increasing depth.

## 3.2 SOUTHEASTERN PLUME

The southeastern plume is defined by LNAPL detected in MW-7 and MW-12. The downgradient limits are delineated by reduced VOC concentration in wells and/or relatively low PID readings in soil borings in MW-29 through MW-32, SB-9 and SB-10. This downgradient limit extends approximately 40 feet beyond the Northern Petroleum property line. The upgradient extent of this plume is less discernable and may merge with the northwestern contaminant plume.

Data collected to date suggest that a release related to the current bulk storage tank system may have contributed to the contamination in this portion of the site. No. 2 fuel oil was identified in soils both above and below the water table in MW-5 and MW-12, both of which are located upgradient of MW-7. No. 2 fuel oil was also identified in groundwater in wells in this area. The hydrogeology in this area of the site is similar to that described in the previous section. PID readings in soil borings indicate that the vertical extent of contamination extends into the underlying coarse sand and gravel layer, generally decreasing in concentration with increasing depth.

# 4.0 INVESTIGATIVE PROCEDURES AND RESULTS

## 4.1 GROUNDWATER ELEVATION AND FLOW DIRECTION

During the July 2006 monitoring event, groundwater in the unconfined surficial aquifer at the site appeared to flow generally southeast toward the Passumpsic River, which is consistent with previous data. However, there appears to be anomalous groundwater elevations in the southeastern corner of the site in the vicinity of the tank farm. The cause of the lower groundwater elevations is unknown, but it may be hindering off-site migration by acting as a collection area for LNAPL in the southeast corner of the site. Gradients may vary in this location due to geologic factors (i.e. subsurface gravel layers and slightly finer-grained soils in downgradient soil borings MW-29 through MW-32).

The average horizontal hydraulic gradient was approximately 0.16 percent between MW-13 and MW-17. The vertical groundwater flow components at the site, and the hydraulic relationship between the shallow unconfined aquifer and the bedrock aquifer, are currently unknown.

Fluid levels were measured in the monitoring wells on 17 and 18 July 2006 to calculate the groundwater flow direction. Depths to groundwater in the on-site monitoring wells ranged from 4.06 feet (MW-13) to 7.62 feet (MW-26) below top-of-casing. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet. Groundwater elevations for wells that contained LNAPL were corrected by multiplying the LNAPL thickness by the specific gravity of fuel oil (assumed to be 0.9) and subtracting the result from the measured depth to water. Water-level measurements and elevation calculations are presented in Table 1. A groundwater flow direction map was prepared using these data (Figure 3).

## 4.2 GROUNDWATER SAMPLING AND LABORATORY ANALYSIS

Groundwater samples were collected on 17, 18, and 31 July, 2006 from on-site monitoring wells MW-1, MW-2 ECS, MW-4, MW-5, MW-13, MW-16, MW-17, MW-18, and MW-19, and off-site wells MW-8, MW-26, MW-27, MW-29, MW-31, MW-32, MW- 2 (existing well), MW-101, and MW-102 and analyzed for the possible presence of VOCs via the EPA Method 8021B list of petroleum-related VOCs (Figure 5). Samples were not collected from MW-4 or MW-11 because these wells could not be located during the sampling events. In accordance with ECS and industry standard operating procedures, groundwater samples were not collected from four monitoring wells in which LNAPL was detected (MW-7, MW-12, MW-22, and MW-28). No petroleum VOCs were detected in off-site wells MW-1R, MW-26, MW-27, MW-32 or MW-101.

VGES[1] were exceeded for one or more petroleum hydrocarbons in samples collected from eleven monitoring wells, including one offsite downgradient well (MW-8). Total BTEX concentrations in these eleven samples ranged from 5.0 micrograms per liter (µg/L) in MW-8 to 7,961 µg/L in onsite well MW-17. The total BTEX concentrations in upgradient Lewis Oil wells MW-2 and MW-102 were 169.8 and 18.6 µg/L, respectively. BTEX concentrations in most wells increased an average of 269 percent since the February 2006 sampling event.

The gasoline additive methyl tert-butyl ether (MTBE) was detected in eight wells located throughout the site at concentrations ranging from 3.3 µg/L in MW-31 to 5,620 µg/L in MW-1. This is generally consistent with the data collected during the initial site investigation, however, MTBE was detected in off-site wells MW-29 and MW-30 for the first time since sampling began.

LNAPL was measured in onsite wells MW-7, MW-12, MW-22, and MW-28 at thicknesses of 0.13, 0.20, 1.36 and 0.64 feet, respectively (Table 1). Bail-down testing was performed during this monitoring event and is discussed in more detail in Section 3.3.

Prior to groundwater sample collection, the monitoring wells were purged using low-flow sampling techniques in accordance with ECS and industry standard protocols. Purge water was discharged directly to the ground in the vicinity of each well. A trip blank and a duplicate sample were collected to ensure that adequate quality assurance/quality control (QA/QC) standards were maintained.

All samples were transported under chain-of-custody in an ice-filled cooler to Spectrum Analytical, Inc. of Agawam, Massachusetts. Relative percent difference (RPD) values for the duplicate sample, collected from MW-16, were within the EPA guideline of 30 percent. No VOCs were detected in the trip blank. Analytical results are included in Table 2 and the laboratory analytical reports are presented in Appendix A; time series graphs are presented in Figures 5-28.

### 4.3 BAILDOWN TESTING

ECS performed weekly LNAPL gauging and removal from monitoring wells MW-7, MW-12, MW-22, and MW-28 on 18 July, 24 July, 31 July, and 7 August 2006. A total of 0.29 gallons of LNAPL was recovered and stored on-site. LNAPL thickness was determined using an interface probe. The information gathered from the bail-down test was used to evaluate the actual LNAPL thickness and the success of LNAPL removal efforts at the site.

On 18 July 2006, the initial LNAPL thickness in MW-7 was 0.13 feet and recovered to an average thickness of 0.10 feet over the next 30 minutes. The actual LNAPL thickness is estimated to be 0.01 feet, based on graphical interpretation[1]. A total of 40 milliliters (mL) or 0.01 gallons were recovered. During the next three visits, the initial LNAPL thickness decreased from 0.13 feet on 24 July 2006 to 0.01 feet on 7 August 2006. A total of 65 mL was recovered from MW-7. LNAPL removal efforts resulted in a decrease of product thickness over the four week monitoring period, indicating that LNAPL removal may be successful in the vicinity of the southeastern plume.

Due to difficulty locating MW-12, baildown testing was only performed on 31 July 2006. The actual LNAPL thickness is estimated to be 0.02 feet, based on graphical interpretation[1]. The initial LNAPL thickness in MW-12 was 0.20 feet and recovered to an average thickness of 0.12 feet over the next 80 minutes. A total of 40 mL or 0.01 gallons were recovered.

On 18 July 2006, the initial LNAPL thickness in MW-22 was 1.36 feet and recovered to an average thickness of 0.16 feet over the next 30 minutes. The actual LNAPL thickness is estimated to be 0.01 feet, based on graphical interpretation[1]. A total of 500 mL or 0.13 gallons were recovered. During the next three visits, LNAPL thickness decreased to 0.23 feet on 24 July 2006 and 0.13 feet on 31 July 2006. The thickness on 7 August 2006 was 1.45 feet. A total of 730 mL was recovered from MW-22. LNAPL removal efforts resulted in a decrease of product recovery over the three week monitoring period, with the exception of the 7 August 2006 initial LNAPL thickness.

On 18 July 2006, the initial LNAPL thickness in MW-28 was 0.64 feet and recovered to an average thickness of 0.15 feet over the next 30 minutes. The actual LNAPL thickness is estimated to be 0.03 feet,

[1] Hughes, J.P., Sullivan, C.R., and Zinner, R.E., 1988. Two Techniques for Determining the True Hydrocarbon Thickness in an Unconfined Sandy Aquifer. *Proceedings of the Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection and Restoration*, November 1988, Pages 291 to 314.

based on graphical interpretation[1]. A total of 200 mL or 0.05 gallons were recovered. No LNAPL was detected during the 24 July 2006 site visit. LNAPL thickness was 0.35 feet on 24 July 2006 and 0.16 feet on 7 August 2006. A total of 250 mL was recovered from MW-28. LNAPL removal efforts resulted in a decrease of product thickness during the four weeks.

Bail-down test data are presented in Charts 1 through 4 in Appendix C. Bail-down test data indicate that in most monitoring locations, the LNAPL thickness decreased with each removal effort.

### 4.4 CONTAMINANT MASS ESTIMATES

**Northwestern Plume**

Based on soil samples collected on 18 July 2005, estimates of contaminant mass and LNAPL saturation were calculated in soils above and below the water table. Approximately 25,000 pounds of predominantly fuel oil-related hydrocarbon contamination are estimated to be present above the water table within the 1,000 µg/L total VOC isopleth from the July 2006 monitoring event (Table 3), representing a LNAPL saturation of approximately 5 percent in the pore spaces above the water table. Approximately 38,000 pounds of predominantly fuel oil-related hydrocarbon contamination are estimated to be present at or below the water table within the 1,000 µg/L total VOC isopleth from the July 2006 monitoring event (Table 4), representing an LNAPL saturation of approximately 3.7 percent in the pore spaces above the water table.

Mass estimates were calculated based on TPH soil analytical data (presented in the December 2005 Site Investigation Report) from samples collected from monitoring wells MW-1, MW-2 ECS, MW-17, and MW-18.

**Southeastern Plume**

Based on soil samples collected on 18 July 2005, estimates of contaminant mass and LNAPL saturation were calculated in soils above and below the water table. Approximately 3,000 pounds of predominantly fuel oil-related hydrocarbon contamination are estimated to be present above the water table within the 1,000 µg/L total VOC isopleth from the July 2006 monitoring event (Table 3), representing a LNAPL saturation of approximately 1.3 percent in the pore spaces above the water table. Approximately 516 pounds of predominantly fuel oil-related hydrocarbon contamination are estimated to be present at or below the water table within the 1,000 µg/L total VOC isopleth from the July 2006 monitoring event (Table 4), representing a LNAPL saturation of approximately 0.2 percent in the pore spaces above the water table. Based on these calculations, there appears to be more mass above the water table in the southeastern portion of the site, suggesting that on-site sources may be responsible for contamination.

Mass estimates were calculated based on TPH soil analytical data (presented in the December 2005 Site Investigation Report) from samples collected from monitoring wells MW-5, MW-12, and MW-13.

# 5.0 EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

Based on Site-specific conditions and the type and distribution of petroleum contamination detected in Site soil and groundwater, potentially applicable technologies were evaluated for their effectiveness at remediating Site contamination (Table 5 – Initial Screening of Remediation Alternatives). The screening process was based upon the Federal Remediation Technologies Screening Matrix and Reference Guide Version 4.0. Each of the remedial action alternatives was scored on the basis of its effectiveness, reliability, cleanup time, and overall costs to reduce the level of risk posed by the concentrations of contamination in the groundwater and soil at the Site. The scoring was determined as follows:

| | **TECHNOLOGY EVALUATION CRITERIA** | | | | |
|---|---|---|---|---|---|
| **CHARACTERISTIC** | **0** | **3** | **5** | **7** | **10** |
| **Effectiveness** | Ineffective | Possible | Somewhat Effective | Effective | Very Effective |
| **Reliability** | Not Reliable | Limited Reliability | Somewhat Reliable | Reliable | Very Reliable |
| **Cleanup Time** | Slowest | Slow | Average | Fast | Fastest |
| **Overall Costs** | Exorbitant | Very Costly | Average Cost | Inexpensive | Low or No Cost |

A remedial action alternative was considered to be Not Viable if the effectiveness, reliability, or overall cleanup time of the alternative was considered to be zero or if the combined score of the effectiveness, reliability, cleanup time, and overall costs was calculated to be less than 15. A remedial action alternative was considered to be Potentially Viable if the effectiveness, reliability, and overall cleanup time were greater than zero and if the combined score of effectiveness, reliability, cleanup time, and overall costs was between 15 and 20. A remedial action alternative was considered to be Viable if the effectiveness, reliability, and overall cleanup time were greater than zero and if the combined score of effectiveness, reliability, cleanup time, and overall costs was greater than 20.

In-situ and ex-situ remediation options were evaluated during this investigation. Due to the presence of upgradient contamination, a majority of full-scale site-wide remediation technologies were not retained because of the likelihood of recontamination from off-site properties. A more aggressive remedial approach on-site may exacerbate the migration of contaminants onto the Northern Petroleum site. Excavation may be a viable technology at this site; however, due to challenges at the site, including the location of the tank farm and berm, and the presence of downgradient contamination on the property of an uncooperative adjacent landowner, excavation was not retained as a remedial alternative at this time. Three potential treatment options were retained for further evaluation until contamination at upgradient properties are addressed. Viable remedial action alternatives included:

- Capping;
- LNAPL recovery; and,
- Enhanced Fluid Recovery (EFR).

### 5.1 CAPPING

Description
Capping would include paving the grassy or porous media surfaces on the site (approximately 33,600 square feet). The current parking lot consists of gravel. Paving the parking lot would limit exposure of subsurface constituents, reduce infiltration of surface water and contaminant migration, and prevent leaks and spills from impacting the ground surface.

Effectiveness
Capping is an effective way of reducing infiltration and preventing petroleum leaks and spills from entering the subsurface. Capping will not reduce existing concentrations of contaminated soil and groundwater at the site; however, it will likely reduce migration off-site. Capping at this site may minimize additional solubilization of LNAPL, especially that which is present above the water table. Future remedial activities would require disturbing and reparation of the cap.

Implementability
A majority of the site consists of a gravel parking lot, which would be easily paved. Existing monitoring wells would have to be protected and road boxes elevated to grade. Paving would likely have to occur in the warmer weather months.

Cost
The estimated cost associated with paving the Northern Petroleum parking lot is approximately $70,000.

### 5.2 LNAPL RECOVERY

Description
LNAPL recovery involves pumping or bailing LNAPL from existing monitoring and recovery wells. Pumping could be achieved by the use of permanently-installed LNAPL pumps at specific wells or with a pump or manual collection device that requires a field technician to operate during a site visit.

Manual bailer extraction or passive bailers can be used to remove LNAPL. A passive bailer is a tube that is empty or filled with absorbent material that is lowered into a well, secured with a rope or string, and left to perform its function. Typically, a hydrophobic screen near the top of the unit allows the product to enter and be collected by the absorbent material and keeps the water out. Once installed at a pre-determined level, the passive bailer is able to collect LNAPL only within a set range. LNAPL is removed from the bailer during site visits and stored on-site for eventual off-site disposal.

Effectiveness

Bail-down testing conducted at the site in July-August 2006 suggests that LNAPL thickness was effectively reduced during each event, and in most cases, remained lower the following week, suggesting that the actual plume thickness is less than that measured and/or LNAPL recharge is slow. The effectiveness of LNAPL recovery is determined based on the extent and thickness of the LNAPL plume, the spacing of extraction wells, the recovery method and the rate of LNAPL recharge. Larger-diameter extraction wells (2-inch or greater) will be necessary to accommodate the LNAPL recovery pumps and passive bailers, and would likely have greater recovery than the existing one-inch microwells. Passive bailers and product pumps, such as the Spill Buddy Pro by Clean Earth Technologies, effectively remove only LNAPL from the well. Passive bailers are relatively inexpensive, but require positioning the unit at the proper depth as the water table fluctuates. The average groundwater fluctuation at the site, based on data from three monitoring events, is 1.2 feet.

LNAPL recovery has a fair to moderate certainty of success at eliminating LNAPL; however, this technique is unlikely to reduce VOCs in soils or groundwater to levels approaching background concentrations over the long term. Therefore this alternative is recommended as a temporary solution until upgradient sources of contamination are remediated.

Implementability
Product recovery pumps that are permanently installed would require very little maintenance and would be fairly easy to implement. Tubing may have to be installed underground at a shallow depth to a 55-gallon drum. A field pump or bailer extraction would be easy to implement, but would require more frequent site visits.

Costs
Table 6 includes a summary of preliminary estimated costs associated with LNAPL removal at the Site using bailer events, pump events, and permanently-installed product pumps. Costs have been estimated based on one year of operation with semi-annual groundwater monitoring and quarterly reporting. Monthly site visits are assumed for bailer removal and field pumping events. Permanently-installed product pumps would be installed in six newly-installed extraction wells, and site visits would be scheduled every other month. Equipment costs have been estimated using purchase pricing from Clean Earth Technologies; these costs may be reduced based on monthly rental options.

| TABLE 6 | Passive Bailers | Field Pumping | Installed Pumps |
|---|---|---|---|
| Install Monitoring Wells (>/=2") | $10,000 | $10,000 | $10,000 |
| LNAPL Removal (monthly for 1 year) | $12,000 | $15,000 | $0 |
| Pump installation and O&M (6 wells) | $0 | $0 | $50,000 |
| Groundwater Monitoring (semi-annually) | $10,000 | $10,000 | $10,000 |
| Reporting (quarterly) & Coordination | $8,000 | $8,000 | $8,000 |
| **TOTAL ESTIMATED COST** | **$40,000** | **$43,000** | **$78,000** |

### 5.3 ENHANCED FLUID RECOVERY

Description
EFR utilizes a vacuum truck to periodically apply a vacuum to recovery wells in order to extract LNAPL and dissolved-phase petroleum-impacted groundwater. EFR events only require the installation of recovery wells with no trenches or conveyance piping. Periodically, impacted groundwater, vapor, and/or LNAPL are recovered by applying a vacuum on the recovery well or trench. This alternative is effective at extracting source and residual hydrocarbon constituents present in both unsaturated and saturated zones, and it is highly effective in silty or low permeability soils.

Recovered fluids would be shipped to a licensed hazardous waste treatment facility via vacuum tanker truck. Vapors generated from the vacuum blower during extraction will be treated using vapor-phase granular activated carbon (GAC) units. These units will be left on-site until sufficient extraction events have occurred to induce breakthrough, at which time the GAC units will be replaced with fresh GAC, and the spent GAC will be transported to a licensed GAC regeneration facility.

Effectiveness
EFR remediation has a moderate to high certainty of success at reducing concentrations of absorbed-phase hydrocarbons and eliminating LNAPL; however, this technique is unlikely to reduce VOCs to

levels approaching background concentrations over the long term. Therefore this alternative is recommended as a temporary solution until upgradient sources of contamination are resolved. Larger-diameter extraction wells (2-inch or greater) will be necessary to conduct EFR.

Implementability

This remedial action alternative is not technically complex, and will not be difficult to implement. EFR remediation would only require subsurface excavations associated with the installation of recovery wells; however, each vacuum truck extraction event will require coordination with site workers and personnel due to the use of temporary hoses and placement of the vacuum tanker truck.

Cost

Table 7 includes a summary of preliminary estimated costs associated with LNAPL removal at the Site using EFR. A cost of $58,000 is estimated based on six LNAPL recovery events in one year.

| TABLE 7 | EFR |
|---|---|
| Install Monitoring Wells (>/=2") | $10,000 |
| EFR events (6/yr for 1 year) | $30,000 |
| Groundwater Monitoring (semi-annually) | $10,000 |
| Reporting (quarterly) & Coordination | $8,000 |
| **TOTAL ESTIMATED COST** | **$58,000** |

## 5.4 SUMMARY

Based upon our current understanding of the Site conditions and the results of the bail-down testing and this remedial alternative screening, ECS recommends that LNAPL removal with passive bailers be conducted in the vicinity of the southeastern plume. Additional monitoring wells are recommended to delineate the full extent of free product and facilitate LNAPL recovery. Paving would enhance the LNAPL removal efforts by minimizing contaminant migration. Paving will also reduce solubilization of LNAPL in the unsaturated zone at this site. Justification for using these technologies is as follows:

- LNAPL recovery would provide a cost-effective way of reducing and/or eliminating LNAPL to minimize further on-site dissolved-phase contaminant plume migration and expedite site closure;
- The average groundwater fluctuation is 1.2 feet; therefore, passive bailers would not require frequent repositioning with high and low water table conditions;
- Paving is recommended to reduce migration of dissolved-phase contaminants and minimize solubilization of LNAPL, especially from the unsaturated soils at the site; and
- A more comprehensive remediation system may be recommended when upgradient sources are addressed.

# TABLES

**Table 1.**
**Groundwater Elevations**

521 Bay Street
St. Johnsbury, VT

Monitoring Date: 17 & 18 July 2006 (3 wells on 31st)

| Well I.D. | Top of Casing Elevation | Depth to Product | Depth to Water | Product Thickness | Corrected Depth to Water | Water Table Elevation |
|---|---|---|---|---|---|---|
| MW-1 | 100.00 | | 4.80 | | | 95.20 |
| MW-1R | - | | 4.85 | | | - |
| MW-2 (existing) | 100.14 | | 4.80 | | | 95.34 |
| MW-2ECS | 100.16 | | 5.48 | | | 94.68 |
| MW-4 | 99.15 | | NS | | | - |
| MW-5 | 98.95 | | 4.20 | | | 94.75 |
| MW-7 | 100.50 | 5.62 | 5.75 | 0.13 | 5.63 | 94.87 |
| MW-8 | 100.67 | | 5.86 | | | 94.81 |
| MW-11 | 98.75 | | NS | | | - |
| MW-12* | 98.65 | 3.88 | 4.08 | 0.2 | 3.90 | 94.75 |
| MW-13 | 98.98 | | 4.06 | | | 94.92 |
| MW-16 | 99.56 | | 4.55 | | | 95.01 |
| MW-17 * | 99.83 | | 4.75 | | | 95.08 |
| MW-18 * | 99.96 | | 4.73 | | | 95.23 |
| MW-19 | 100.05 | | 4.68 | | | 95.37 |
| MW-22 | 99.95 | 4.43 | 5.79 | 1.36 | 4.57 | 95.38 |
| MW-26 | 102.76 | | 7.62 | | | 95.14 |
| MW-27 | 102.90 | | 7.39 | | | 95.51 |
| MW-28 | 102.09 | 6.92 | 7.56 | 0.64 | 6.98 | 95.10 |
| MW-29 | 99.63 | | 4.70 | | | 94.93 |
| MW-30 | 100.01 | | 5.01 | | | 95.00 |
| MW-31 | 99.95 | | 4.82 | | | 95.13 |
| MW-32 | 99.75 | | 4.66 | | | 95.09 |
| MW-101 (existing) | -- | | 4.81 | | | -- |
| MW-102 | -- | | 4.20 | | | -- |

Notes:

All values reported in feet relative to a datum of 100.00 ft.

NS - Not Sampled

* sampled on 7/31/06

Corrected ground-water elevations were calculated by multiplying the petroleum product thickness by the specific gravity of #2 fuel oil (0.9) and subtracting the result from the measured depth to water.

**Table 2.**
**Summary of Groundwater Analytical Results**

521 Bay Street
St. Johnsbury, VT

Monitoring Dates: 17-18 and 31 July 2006

| ON-SITE MONITORING WELLS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Identification** | ***VGES*** | MW-1 | MW-2 ECS | MW-4 | MW-5 | MW-11 | MW-12 | MW-13 | MW-16 | MW-17 | MW-18 | MW-19 | MW-22 |
| **Sampling Date** | | 7/17/06 | 7/17/06 | 7/17/06 | 7/17/06 | 7/17/06 | 7/17/06 | 7/17/06 | 7/17/06 | 7/31/06 | 7/31/06 | 7/17/06 | 7/17/06 |
| **VOLATILE ORGANIC COMPOUBRLS by EPA Method 8260B (µg/L)** | | | | | | | | | | | | | |
| Benzene | 5 | **536** | **782** | NS | **149** | NS | FP | **104** | **202** | **1450** | **728** | **91.6** | FP |
| Ethylbenzene | 700 | **263** | **450** | NS | BRL<5.0 | NS | FP | BRL<1.0 | BRL<5.0 | **549** | **150** | **233** | FP |
| Toluene | 1,000 | **142** | **94.5** | NS | BRL<5.0 | NS | FP | BRL<1.0 | BRL<5.0 | **2,110** | **125** | **460** | FP |
| Total Xylenes | 10,000 | **1,152** | **1,241.0** | NS | BRL<15.0 | NS | FP | BRL<3.0 | **11.4** | **3,852** | **768.8** | **951** | FP |
| BTEX | -- | **2,093** | **2,567.5** | NS | **149** | NS | FP | **104** | **213.4** | **7,961** | **1,772** | **1,736** | FP |
| Naphthalene | 20 | **90.0** | **132** | NS | **12.8** | NS | FP | BRL<1.0 | **47.2** | **364** | **87.8** | **84.6** | FP |
| 1,2,4-Timethylbenzene | 5 | **230** | **270** | NS | **20.5** | NS | FP | **1.1** | **48.5** | **819** | **277** | **248** | FP |
| 1,3,5-Timethylbenzene | 4 | **65.5** | **74.0** | NS | BRL<5.0 | NS | FP | BRL<1.0 | **18.2** | **242** | **70.6** | **66.5** | FP |
| Methyl tert-butyl ether | 40 | **5,620** | **1,610** | NS | **352** | NS | FP | **133** | BRL<5.0 | **14.0** | **108** | BRL<5.0 | FP |

Notes:
-- - not analyzed or not applicable
µg/L - micrograms per liter
BRL – Below Reporting Limit
FP - Free-phase product in well; well not sampled.
mg/L - milligrams per liter
NS - Not Sampled
VGES - Vermont Groundwater Enforcement Standards (exceedances are shaded)
MW-4 and MW-11 were not located during the sampling event.

**Table 2.**
**Summary of Groundwater Analytical Results**

521 Bay Street
St. Johnsbury, VT

Monitoring Dates: 17-18 and 31 July 2006

| OFF-SITE MONITORING WELLS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Identification** | ***VGES*** | MW-1R | MW-7 | MW-8 | MW-26 | MW-27 | MW-28 | MW-29 | MW-30 | MW-31 | MW-32 | MW-2 (existing well) | MW-101 (existing well) | MW-102 |
| **Sampling Date** | | 7/18/06 | 7/17/06 | 7/18/06 | 7/17/06 | 7/17/06 | 7/17/06 | 7/18/06 | 7/18/06 | 7/18/06 | 7/18/06 | 7/18/06 | 7/18/06 | 7/17/06 |
| **VOLATILE ORGANIC COMPOUBRLS by EPA Method 8260B (µg/L)** | | | | | | | | | | | | | | |
| Benzene | 5 | BRL<1.0 | FP | **5.0** | BRL<1.0 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | **58.4** | BRL<1.0 | **5.2** |
| Ethylbenzene | 700 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | **37.2** | BRL<1.0 | BRL<1.0 |
| Toluene | 1,000 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | **8.4** | BRL<1.0 | **1.2** |
| Total Xylene | 10,000 | BRL<3.0 | FP | BRL<3.0 | BRL<3.0 | BRL<3.0 | FP | BRL<3.0 | BRL<3.0 | BRL<3.0 | BRL<3.0 | **65.8** | BRL<3.0 | **13.4** |
| BTEX | -- | BRL | FP | **5.0** | BRL | BRL | FP | BRL | BRL | BRL | BRL | **169.8** | BRL | **18.6** |
| Naphthalene | 20 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | **12.4** | BRL<1.0 | **8.1** |
| 1,2,4 Trimethylbenzene | 5 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | **40.0** | BRL<1.0 | **12.7** |
| 1,3,5 Trimethylbenzene | 4 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | FP | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | **12.0** | BRL<1.0 | **9.3** |
| MTBE | 40 | BRL<1.0 | FP | **38.6** | BRL<1.0 | BRL<1.0 | FP | **10.0** | **3.8** | **3.3** | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 |

Notes:
-- - not analyzed or not applicable
µg/L - micrograms per liter
BRL – Below Reporting Limit
FP - Free-phase product in well; well not sampled.
mg/L - milligrams per liter
CL - Cannot Locate; well not sampled
NS - Not Sampled
VGES - Vermont Groundwater Enforcement Standards (exceedances are shaded)

**Table 2.**
**Summary of Groundwater Analytical Results**

521 Bay Street
St. Johnsbury, VT

Monitoring Dates: 17-18 and 31 July 2006

| QA/QC SAMPLES | | | | | |
|---|---|---|---|---|---|
| **Sample Identification** | ***VGES*** | Trip | Duplicate | Original Sample (MW-16) | % difference |
| **Sampling Date** | | 7/17/06 | 7/17/06 | 7/17/06 | -- |
| **VOLATILE ORGANIC COMPOUBRLS (µg/L)** | | | | | |
| Benzene | 5 | BRL<1.0 | **186** | **202** | 8.2 |
| Ethylbenzene | 700 | BRL<1.0 | BRL<5.0 | BRL<5.0 | -- |
| Toluene | 1,000 | BRL<1.0 | BRL<5.0 | BRL<5.0 | -- |
| Total Xylene | 10,000 | BRL<3.0 | **11.5** | **11.4** | 0.9 |
| BTEX | -- | -- | **186** | **213.4** | -- |
| Naphthalene | 20 | BRL<1.0 | **46.0** | **47.2** | 2.6 |
| 1,2,4 Trimethylbenzene | 5 | BRL<1.0 | **46.0** | **48.5** | 5.3 |
| 1,3,5 Trimethylbenzene | 4 | BRL<1.0 | **17.8** | **18.2** | 2.2 |
| MTBE | 40 | BRL<1.0 | BRL<5.0 | BRL<5.0 | - |

Notes:
-- - not analyzed or not applicable
µg/L - micrograms per liter
BRL – Below Reporting Limit
FP - Free-phase product in well; well not sampled.
mg/L - milligrams per liter
NS - Not Sampled
VGES - Vermont Groundwater Enforcement Standards (exceedances are shaded)
CL - Cannot Locate; well not sampled

**Table 3**

**Mass Estimates of Total Petroleum Hydrocarbons (TPH) Detected in Soil Above the Water Table**

**Northern Petroleum**

**St. Johnsbury, Vermont**

| Sample ID | MW-1 | MW-2 ECS | MW-17 | MW-18 | MW-5 | MW-12 | MW-13 |
|---|---|---|---|---|---|---|---|
| Sample Depth (feet) | 2 feet | 3 feet | 4.5 feet | 4 feet | 2 feet | 3 feet | 4.5 feet |
| Sampling Date | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 |
| **Total Petroleum Hydrocarbons (mg/Kg)** | **Northwestern Plume** | | | | **Southeastern Plume** | | |
| Fuel Identification | - | #2 fuel oil and other oil | #2 fuel oil | #2 fuel oil | #2 fuel oil | - | - |
| **TOTAL VPH (mg/Kg)** | 6,110 | 1,920 | 4,630 | 14,300 | 190 | 3,620 | 1,400 |
| **AVERAGE VPH IN SOIL (mg/Kg)** | **6,740** | | | | **1,737** | | |
| Estimated Plume Area ($ft^2$) | 8,400 | | | | 4,000 | | |
| Impacted Soil Thickness (ft) | 3 | | | | 3 | | |
| Total Soil Volume ($yd^3$) | 933 | | | | 444 | | |
| Total Weight of Soil (Kg) | 1,696,970 | | | | 808,081 | | |
| Residual TPH Mass (Kg) | 11,438 | | | | 1,403 | | |
| Residual TPH Mass (Lbs) | 25,163 | | | | 3,087 | | |
| Equivalent Volume of LNAPL (gallons) | **4,133** | | | | **507** | | |
| NAPL Saturation (% pore space) | 4.98% | | | | 1.28% | | |

**Table 4**

**Mass Estimates of Total Petroleum Hydrocarbons (TPH) Detected in Soil at or below the Water Table**

**Northern Petroleum**

**St. Johnsbury, Vermont**

| Sample ID | MW-1 | MW-2 ECS | MW-17 | MW-18 | MW-5 | MW-12 | MW-13 |
|---|---|---|---|---|---|---|---|
| Sample Depth (feet) | 8 feet | 11 feet | 5 feet | 6 feet | 8 feet | 11 feet | 7 feet |
| Sampling Date | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 | 7/18/2005 |
| **Total Petroleum Hydrocarbons (mg/Kg)** | **Northwestern Plume** | | | | **Southeastern Plume** | | |
| Fuel Identification | #2 fuel oil and other oil | #2 fuel oil | #2 fuel oil | #2 fuel oil | - | #2 fuel oil | - |
| **TOTAL VPH (mg/Kg)** | 1,750 | 55.9 | 17,700 | 725 | 369 | 104 | 180 |
| **AVERAGE VPH IN SOIL (mg/Kg)** | **5,058** | | | | **218** | | |
| Estimated Plume Area ($ft^2$) | 8,400 | | | | 4,000 | | |
| Impacted Soil Thickness (ft) | 6 | | | | 4 | | |
| Total Soil Volume ($yd^3$) | 1,867 | | | | 593 | | |
| Total Weight of Soil (Kg) | 3,393,939 | | | | 1,077,441 | | |
| Residual TPH Mass (Kg) | 17,166 | | | | 235 | | |
| Residual TPH Mass (Lbs) | 37,764 | | | | 516 | | |
| Equivalent Volume of LNAPL (gallons) | **6,203** | | | | **85** | | |
| NAPL Saturation (% pore space) | 3.74% | | | | 0.16% | | |

**Northern Petroleum**
**St. Johnsbury, Vermont**

**Table 5**
**Initial Screening of Remedial Action Alternatives**

| Response Action | Remedial Technology | Description | Technology Evaluation Criteria[1] | | | | Total Score | Viability[3] | Retained for Evaluation | Solution[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Effectiveness[2] | Reliability | Cleanup Time[2] | Overall Costs | | | | |
| **No Action** | None | No effort to control, remove or monitor impact or control site access. | 0 | 5 | 0 | 10 | 15 | **Not viable**. This alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. Migration of LNAPL and petroleum-contaminated groundwater will not be recorded. | **No** | **NA** |
| **Institutional Controls** | Site fencing and security | Fence site perimeter to restrict access. | 0 | 5 | 0 | 7 | 12 | **Not viable**. This alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. | **No** | **NA** |
| | Activity and Use Limitation | Deed restriction to identify prohibited site uses as well as personal protection for selected site activities. | 0 | 0 | 0 | 7 | 7 | **Not viable**. Alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. In order to achieve site closure, a notice to the land records would be required. | **No** | **NA** |
| **Site Monitoring** | Natural Attenuation | Monitoring of volatilization, dispersion and biological, or chemical degradation of petroleum hydrocarbons over time. | 0 | 0 | 3 | 10 | 13 | **Not viable**. Due to the presence of LNAPL at this site, this alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. | **No** | **NA** |
| **Passive Containment** | Capping | Limits exposure to subsurface constituents and prevents additional infilitration of rain/surface water. | 3 | 7 | 3 | 7 | 20 | **Viable**. The site mostly contains a gravel parking lot. Although this alternative would not reduce contaminant concentrations below applicable standards, it may prevent migration and protect the subsurface from leaks or spills in the future. | **Yes** | **Permanent** |
| | Vertical barriers | Prevents horizontal migration of constituents. | 0 | 5 | 0 | 3 | 8 | **Not viable**. This alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. In order to achieve site closure, a notice to the land records would be required. | **No** | **NA** |
| | NAPL removal | Collect NAPL by passive absorbent socks or containers from existing monitoring wells and recovery wells. | 0 | 3 | 3 | 7 | 13 | **Not Viable**. All of the existing monitoring wells on the site are 1-inch diameter wells, which are too small for absorbant socks. | **No** | **NA** |
| **Active Containment** | NAPL recovery | Pump or bail NAPL from existing monitoring and recovery wells. | 5 | 7 | 5 | 7 | 24 | **Viable**. This alternative would serve to reduce the LNAPL source from the subsurface and and would in turn reduce dissolved-phase concentrations. Off-site contamination would have to be addressed before active remediation would be recommended. | **Yes** | **NA** |
| | Hydraulic Capture | Operation of single or dual phase pump in recovery well. | 3 | 5 | 3 | 3 | 14 | **Not Viable**. Off-site migration of LNAPL onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |

1) Rating scale definitions:
Effectiveness: 0 - ineffective, 3 - possible, 5 - somewhat effective, 7 - effective, 10 - very effective
Reliability: 0 - not reliable, 3 - limited reliability, 5 - somewhat reliable, 7 - reliable, 10 - very reliable
Cleanup Time: 0 - slowest, 3 - slow, 5 - average, 7 - fast, 10 - fastest
Overall Costs: 0 - exorbitant, 3 - very costly, 5 - average cost, 7 - inexpensive, 10 - low or no cost
Total Score: Sum of the individual scores for Effectiveness, Reliability, Cleanup Time, and Overall Costs.
2) Remedial technologies are automatically rejected when effectiveness, reliability, and/or cleanup time are given a score of 0.
3) Viability: Qualitative assessment of the application of the remedial technology to site-specific limitations.
4) Solution: NA - Not Applicable.
5) All ex-situ action would require the excavation of impacted soil and/or groundwater.

**Northern Petroleum**
**St. Johnsbury, Vermont**

**Table 5**
**Initial Screening of Remedial Action Alternatives**

| Response Action | Remedial Technology | Description | Technology Evaluation Criteria[1] | | | | Total Score | Viability[3] | Retained for Evaluation | Solution[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Effectiveness[2] | Reliability | Cleanup Time[2] | Overall Costs | | | | |
| ***In Situ* Treatment** | Deep soil mixing | Large augers are advanced into impacted areas while injecting stabilizing agents. | 0 | 0 | 0 | 0 | 0 | **Not viable**. This alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. | **No** | **NA** |
| | Shallow soil stabilization | Stabilizing agents are injected in impacted areas using injection wells or jet grouting techniques. | 0 | 0 | 0 | 0 | 0 | **Not viable**. This alternative would not reduce dissolved- and adsorbed-phase concentrations below applicable standards. | **No** | **NA** |
| | Biosparging - Air Sparging (AS) | Inject air or pure oxygen below the water table. This process should increase dissolved $O_2$ in the groundwater, enhancing aerobic degradation of petroleum constituents in the saturated and vadose zones. | 3 | 3 | 3 | 5 | 14 | **Not Viable**. Not viable for LNAPL remediation. Off-site migration of LNAPL onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Bioventing - Soil Vapor Extraction (SVE) | SVE system exhausts soil gases from the unsaturated zone, with potential increase of $O_2$ levels in the unsaturated zone, enhancing aerobic degradation of petroleum constituents. | 3 | 3 | 3 | 5 | 14 | **Not Viable**. Not viable for LNAPL remediation. Off-site migration of LNAPL onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Air Sparging and Soil Vapor Extraction | AS system increases dissolved $O_2$ levels in the groundwater, enhancing aerobic degradation of petroleum hydrocarbons, and promotes volatilization of dissolved VPH to the unsaturated zone. SVE system exhausts soil gases from the unsaturated zone, with potential increase of $O_2$ levels in the unsaturated zone, enhancing aerobic degradation of | 3 | 3 | 3 | 5 | 14 | **Not Viable**. Not viable for LNAPL remediation. Off-site migration of LNAPL onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Multi Phase Extraction (MPE) | Impacted groundwater is recovered utilizing recovery wells and either an applied vacuum or submersible pumps. A vacuum is applied to each well to remove VPH-impacted groundwater in the saturated zone and VOC constituents in the unsaturated zone, and to augment the recharge rate for the recovery wells. In addition, airflow is induced through the unsaturated zone enhancing biodegradation of any residual petroleum constituents. | 3 | 3 | 5 | 3 | 14 | **Not Viable**. Off-site migration of free-product onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |

1) Rating scale definitions:
Effectiveness: 0 - ineffective, 3 - possible, 5 - somewhat effective, 7 - effective, 10 - very effective
Reliability: 0 - not reliable, 3 - limited reliability, 5 - somewhat reliable, 7 - reliable, 10 - very reliable
Cleanup Time: 0 - slowest, 3 - slow, 5 - average, 7 - fast, 10 - fastest
Overall Costs: 0 - exorbitant, 3 - very costly, 5 - average cost, 7 - inexpensive, 10 - low or no cost
Total Score: Sum of the individual scores for Effectiveness, Reliability, Cleanup Time, and Overall Costs.
2) Remedial technologies are automatically rejected when effectiveness, reliability, and/or cleanup time are given a score of 0.
3) Viability: Qualitative assessment of the application of the remedial technology to site-specific limitations.
4) Solution: NA - Not Applicable.
5) All ex-situ action would require the excavation of impacted soil and/or groundwater.

**Northern Petroleum**
**St. Johnsbury, Vermont**

**Table 5**
**Initial Screening of Remedial Action Alternatives**

| Response Action | Remedial Technology | Description | Technology Evaluation Criteria[1] | | | | Total Score | Viability[3] | Retained for Evaluation | Solution[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Effectiveness[2] | Reliability | Cleanup Time[2] | Overall Costs | | | | |
| ***In Situ* Treatment (Continued)** | Enhanced Fluid Recovery | Impacted groundwater is recovered utilizing recovery wells and an applied vacuum. A vacuum truck is used to periodically remove VPH-impacted groundwater and LNAPL in the saturated zone and VOC constituents in the unsaturated zone, and to augment the recharge rate for the recovery wells. In addition, airflow is induced through the unsaturated zone permitting biodegradation of any residual petroleum constituents. | 7 | 5 | 3 | 7 | 22 | **Viable**. Periodic events will not be effective at reducing LNAPL thickness and dissolved-phase concentrations. Without addressing the upgradient source of contamination, the potential for continued treatments would be necessary to remove LNAPL. | **Yes** | **NA** |
| | Air-lift Re-Circulation Trench and Natural Attenuation Monitoring | An interceptor trench is used to cut off plume migration. A large diameter well, installed within the trench, contains an internal drop tube positioned at the top of the well screen. Compressed air is routed through the drop tube and travels | 3 | 3 | 5 | 3 | 14 | **Not Viable**. Not viable for LNAPL remediation. Off-site migration of LNAPL onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Addition of biocatalyst to wells | Inject solutions of biocatalyst to wells. Stimulates microbes to degrade hydrocarbons. | 3 | 3 | 3 | 7 | 16 | **Not Viable**. Not viable for LNAPL remediation. | **No** | **NA** |
| | Groundwater chemical treatment. Soil Flushing | Inject surfactants to partition soil constituents into groundwater. Groundwater is continuously extracted and treated. Chemical oxidants or biocatalysts can be flushed within the system during latter stages of treatment. | 3 | 5 | 5 | 5 | 18 | **Not Viable**. Off-site migration of free-product onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Chemical oxidation | Inject chemical oxidants into the subsurface. | 3 | 5 | 5 | 5 | 18 | **Not Viable**. Not viable for LNAPL remediation. Off-site migration of LNAPL onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Steam stripping | Inject steam into subsurface to volatilize and mobilize the hydrocarbons impacts. | 7 | 3 | 3 | 0 | 13 | **Not Viable**. Off-site migration of free-product onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |
| | Vitrification | Apply intense electrical heating of soil matrix, resulting in a glassy mass. | 7 | 3 | 3 | 0 | 13 | **Not Viable**. Off-site migration of free-product onto the site limits the effectiveness of remediation using in-situ technologies without treatment of upgradient properties. | **No** | **NA** |

1) Rating scale definitions:
Effectiveness: 0 - ineffective, 3 - possible, 5 - somewhat effective, 7 - effective, 10 - very effective
Reliability: 0 - not reliable, 3 - limited reliability, 5 - somewhat reliable, 7 - reliable, 10 - very reliable
Cleanup Time: 0 - slowest, 3 - slow, 5 - average, 7 - fast, 10 - fastest
Overall Costs: 0 - exorbitant, 3 - very costly, 5 - average cost, 7 - inexpensive, 10 - low or no cost
Total Score: Sum of the individual scores for Effectiveness, Reliability, Cleanup Time, and Overall Costs.
2) Remedial technologies are automatically rejected when effectiveness, reliability, and/or cleanup time are given a score of 0.
3) Viability: Qualitative assessment of the application of the remedial technology to site-specific limitations.
4) Solution: NA - Not Applicable.
5) All ex-situ action would require the excavation of impacted soil and/or groundwater.

**Northern Petroleum**
**St. Johnsbury, Vermont**

**Table 5**
**Initial Screening of Remedial Action Alternatives**

| Response Action | Remedial Technology | Description | Technology Evaluation Criteria[1] | | | | Total Score | Viability[3] | Retained for Evaluation | Solution[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Effectiveness[2] | Reliability | Cleanup Time[2] | Overall Costs | | | | |
| ***Ex Situ* Treatment [5]** | High temperature incineration | Destroy hydrocarbons by heating soils to high temperature. | 3 | 3 | 10 | 0 | 16 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient property owner. | **No** | **NA** |
| | Medium to high temperature thermal desorption | Remove VOCs and Semi-VOCs by heating excavated soils in a desorption chamber. | 3 | 3 | 10 | 3 | 19 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Co-burning as fuel | Supplement boiler fuel with site residuals. | 3 | 3 | 10 | 0 | 16 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Soil washing | Mix surfactants with excavated soil to separate hydrocarbons from the soil matrix. | 3 | 3 | 5 | 3 | 14 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Solvent extraction | Mix solvent with excavated soil. Solvent treated for removal of hydrocarbons. | 3 | 3 | 5 | 3 | 14 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil | **No** | **NA** |
| | Supercritical extraction | A solvent gas (i.e. $CO_2$) treats impacted soil under supercritical conditions. | 3 | 3 | 10 | 0 | 16 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Cement manufacturing | Supplement fossil fuels with high energy wastes for cement manufacturing. | 3 | 3 | 10 | 0 | 16 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Brick manufacturing | Impacted soil substitutes for shale and clay in the manufacturing. | 3 | 3 | 10 | 0 | 16 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |

1) Rating scale definitions:
Effectiveness: 0 - ineffective, 3 - possible, 5 - somewhat effective, 7 - effective, 10 - very effective
Reliability: 0 - not reliable, 3 - limited reliability, 5 - somewhat reliable, 7 - reliable, 10 - very reliable
Cleanup Time: 0 - slowest, 3 - slow, 5 - average, 7 - fast, 10 - fastest
Overall Costs: 0 - exorbitant, 3 - very costly, 5 - average cost, 7 - inexpensive, 10 - low or no cost
Total Score: Sum of the individual scores for Effectiveness, Reliability, Cleanup Time, and Overall Costs.
2) Remedial technologies are automatically rejected when effectiveness, reliability, and/or cleanup time are given a score of 0.
3) Viability: Qualitative assessment of the application of the remedial technology to site-specific limitations.
4) Solution: NA - Not Applicable.
5) All ex-situ action would require the excavation of impacted soil and/or groundwater.

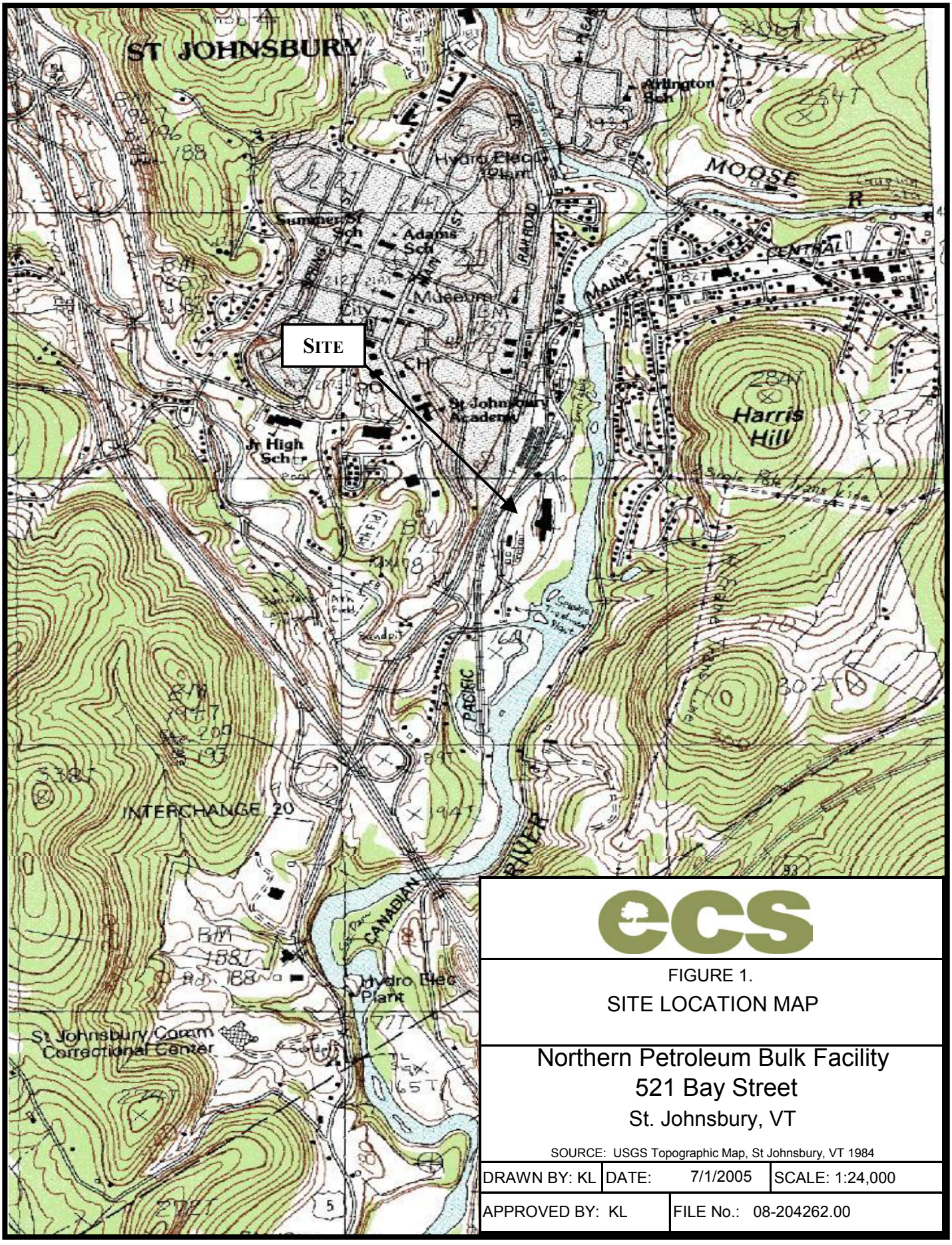
**Northern Petroleum**
**St. Johnsbury, Vermont**

**Table 5**
**Initial Screening of Remedial Action Alternatives**

| Response Action | Remedial Technology | Description | Technology Evaluation Criteria[1] | | | | Total Score | Viability[3] | Retained for Evaluation | Solution[4] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Effectiveness[2] | Reliability | Cleanup Time[2] | Overall Costs | | | | |
| ***Ex Situ* Treatment[5] (Continued)** | Soil vapor extraction | Impacted soil is stockpiled or placed in roll-off containers. Vacuum lines running through the stockpile draw air through the soil which enhances aerobic degradation. | 3 | 3 | 5 | 3 | 14 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Bed treatment | Impacted soil is placed at a thickness that allows aerobic biodegradation to occur. | 3 | 3 | 5 | 3 | 14 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Composting | Impacted soil is stockpiled 3-6 feet in height with bulking agent. | 3 | 3 | 5 | 3 | 14 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Slurry phase bioremediation | Impacted soil is combined with water, nutrients, and microorganisms in a bioreactor and aerated. | 3 | 3 | 5 | 3 | 14 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Asphalt-batch recycling | Combine impacted soil with asphalt material to encapsulate contaminants. | 3 | 3 | 10 | 3 | 19 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient | **No** | **NA** |
| | Off-Site Treatment by Polyencapsulation | Transport impacted soils off-site and place soils on polyethylene sheeting and cover. Soils have to be tested periodically to determine whether the solid equivalent of VGESs are met before approval to thinspread. | 3 | 3 | 5 | 5 | 16 | **Not viable**. Soil excavation would remediate LNAPL saturated soils; however, LNAPL is detected in wells on upgradient off-site properties and may be migrating onto the site . The location of the tank farm and bermed area limits the effectiveness of soil excavation. There are challenges in working with the downgradient property owner. | **No** | **NA** |

1) Rating scale definitions:
Effectiveness: 0 - ineffective, 3 - possible, 5 - somewhat effective, 7 - effective, 10 - very effective
Reliability: 0 - not reliable, 3 - limited reliability, 5 - somewhat reliable, 7 - reliable, 10 - very reliable
Cleanup Time: 0 - slowest, 3 - slow, 5 - average, 7 - fast, 10 - fastest
Overall Costs: 0 - exorbitant, 3 - very costly, 5 - average cost, 7 - inexpensive, 10 - low or no cost
Total Score: Sum of the individual scores for Effectiveness, Reliability, Cleanup Time, and Overall Costs.
2) Remedial technologies are automatically rejected when effectiveness, reliablility, and/or cleanup time are given a score of 0.
3) Viability: Qualitative assessment of the application of the remedial technology to site-specific limitations.
4) Solution: NA - Not Applicable.
5) All ex-situ action would require the excavation of impacted soil and/or groundwater.

# FIGURES




ecs

FIGURE 1.

SITE LOCATION MAP

Northern Petroleum Bulk Facility
521 Bay Street
St. Johnsbury, VT

SOURCE: USGS Topographic Map, St Johnsbury, VT 1984

| | | |
|---|---|---|
| DRAWN BY: KL | DATE: 7/1/2005 | SCALE: 1:24,000 |
| APPROVED BY: KL | FILE No.: 08-204262.00 | |

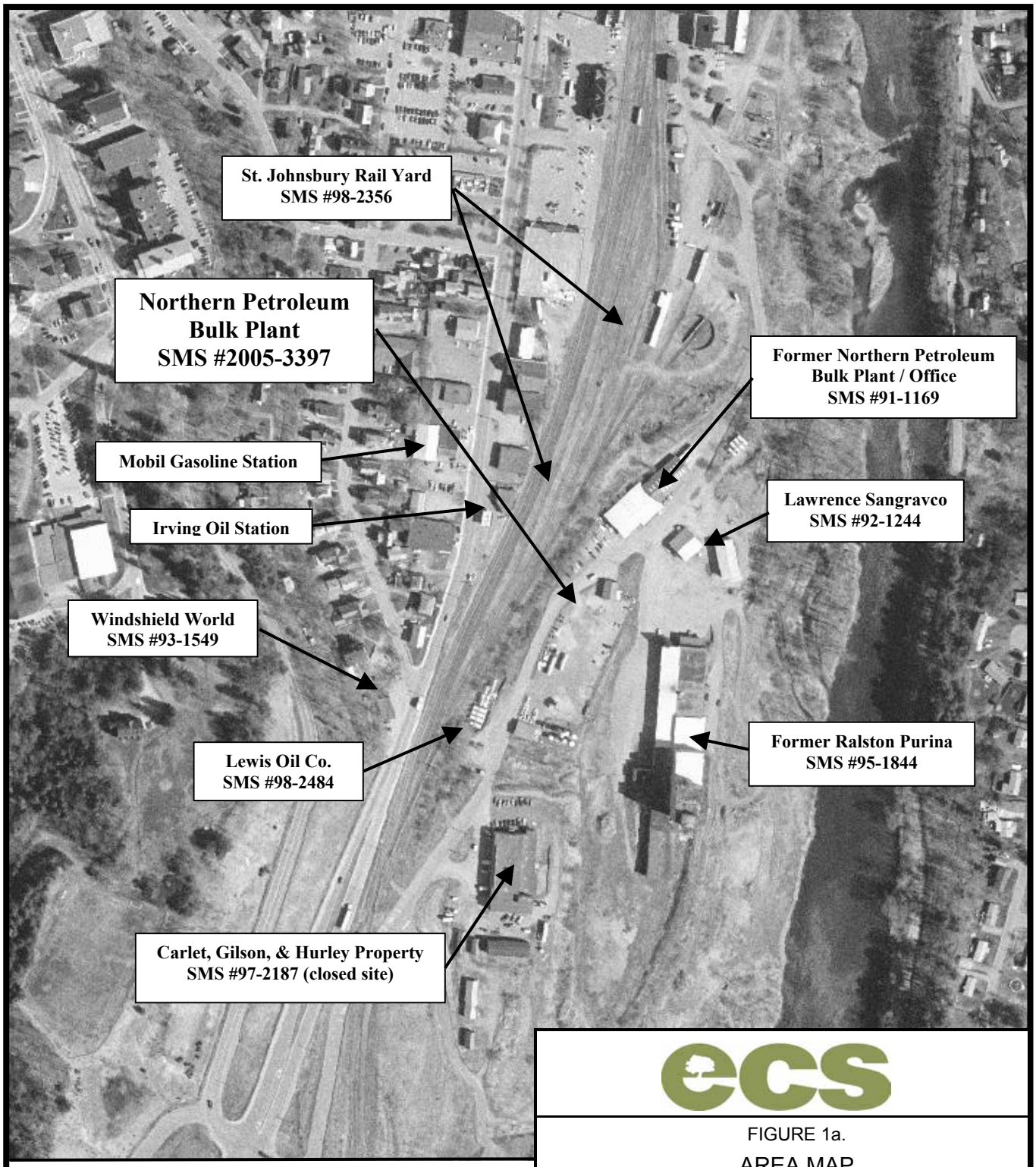


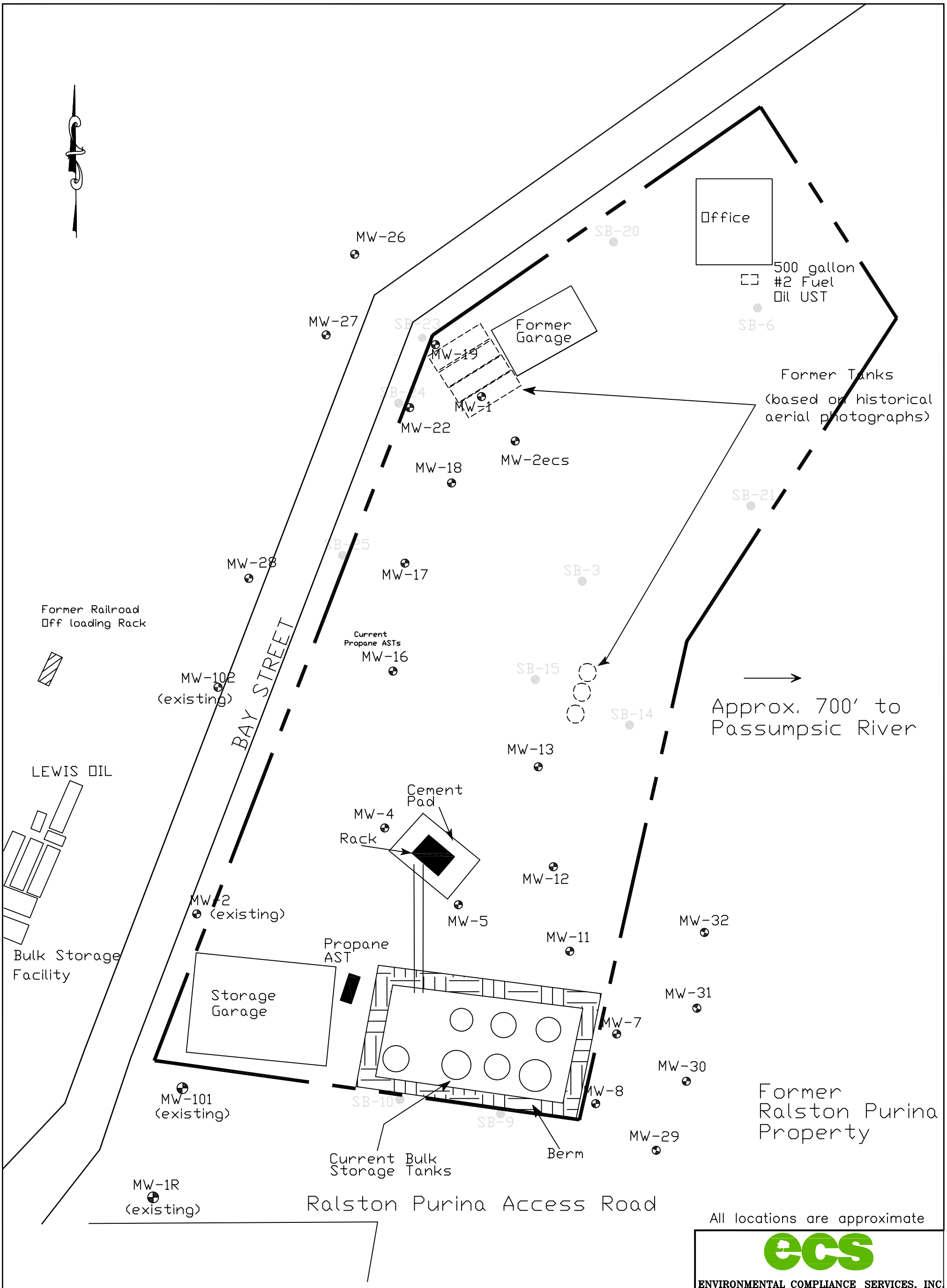

FIGURE 1a.

AREA MAP

Northern Petroleum Bulk Facility
521 Bay Street
St. Johnsbury, VT

SOURCE: USGS Arial Photograph, St Johnsbury, VT 1999

| | | |
|---|---|---|
| DRAWN BY: KL | DATE: 12/1/2005 | SCALE: not to scale |
| APPROVED BY: KL | FILE No.: 08-204262.00 | |




All locations are approximate

LEGEND

MW-2 ⊕ MONITORING WELL
SB-2 SOIL BORING LOCATIONS
PROPERTY LINE

0 40(ft)

ENVIRONMENTAL COMPLIANCE SERVICES, INC.
65 Millet Street, Suite 301 * Richmond, VT 05477

PROJECT:
Northern Petroleum Bulk Facility
521 Bay Street
St. Johnsbury, VT

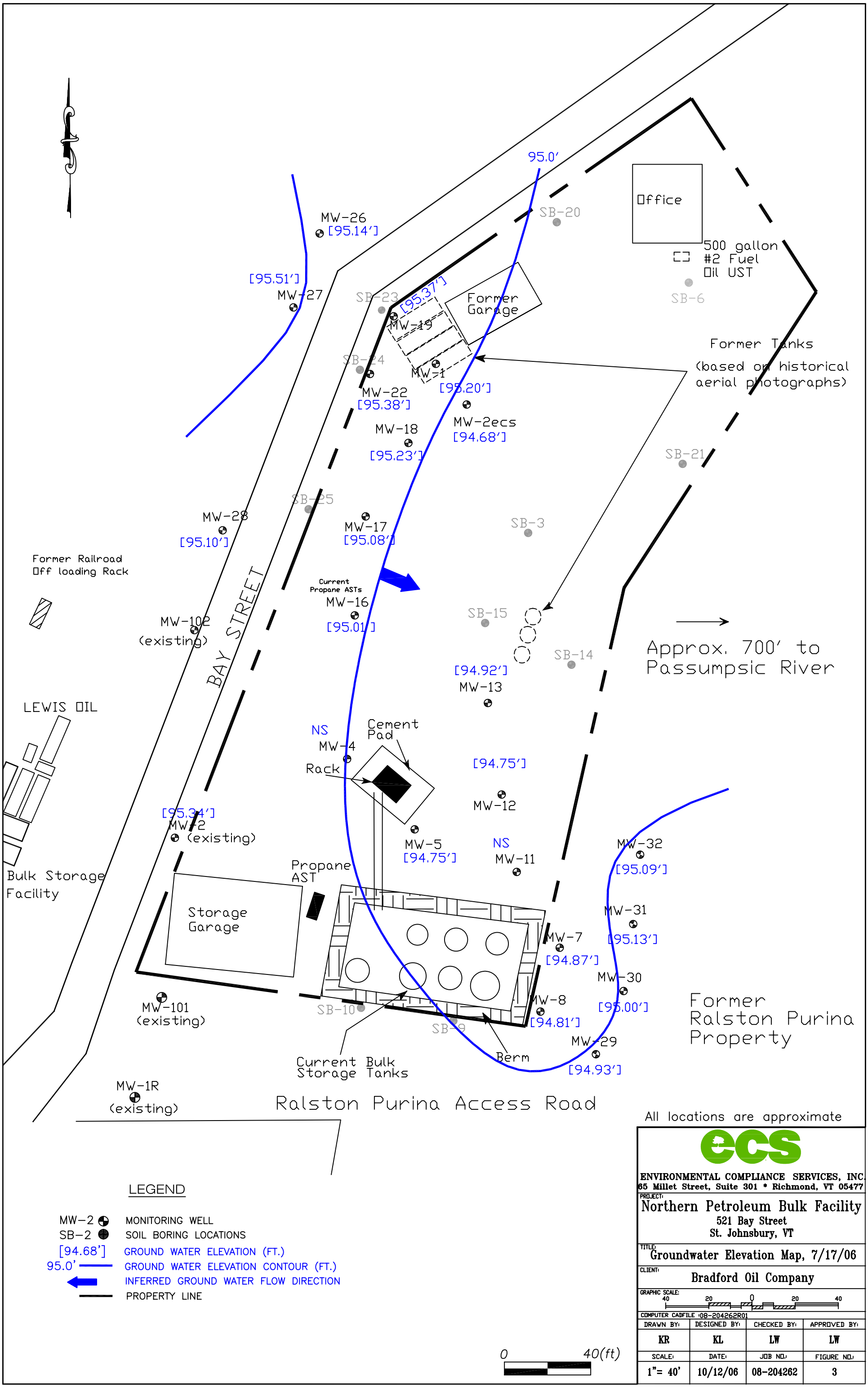
TITLE:
Site Plan

CLIENT:
Bradford Oil Company

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE 08-204262R01.dwg

| DRAWN BY: | DESIGNED BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| KR | KL | LW | LW |
| SCALE: | DATE: | JOB NO.: | FIGURE NO.: |
| 1"= 40' | 10/12/06 | 08-204262 | 2 |




ENVIRONMENTAL COMPLIANCE SERVICES, INC.
65 Millet Street, Suite 301 * Richmond, VT 05477

PROJECT:
**Northern Petroleum Bulk Facility**
521 Bay Street
St. Johnsbury, VT

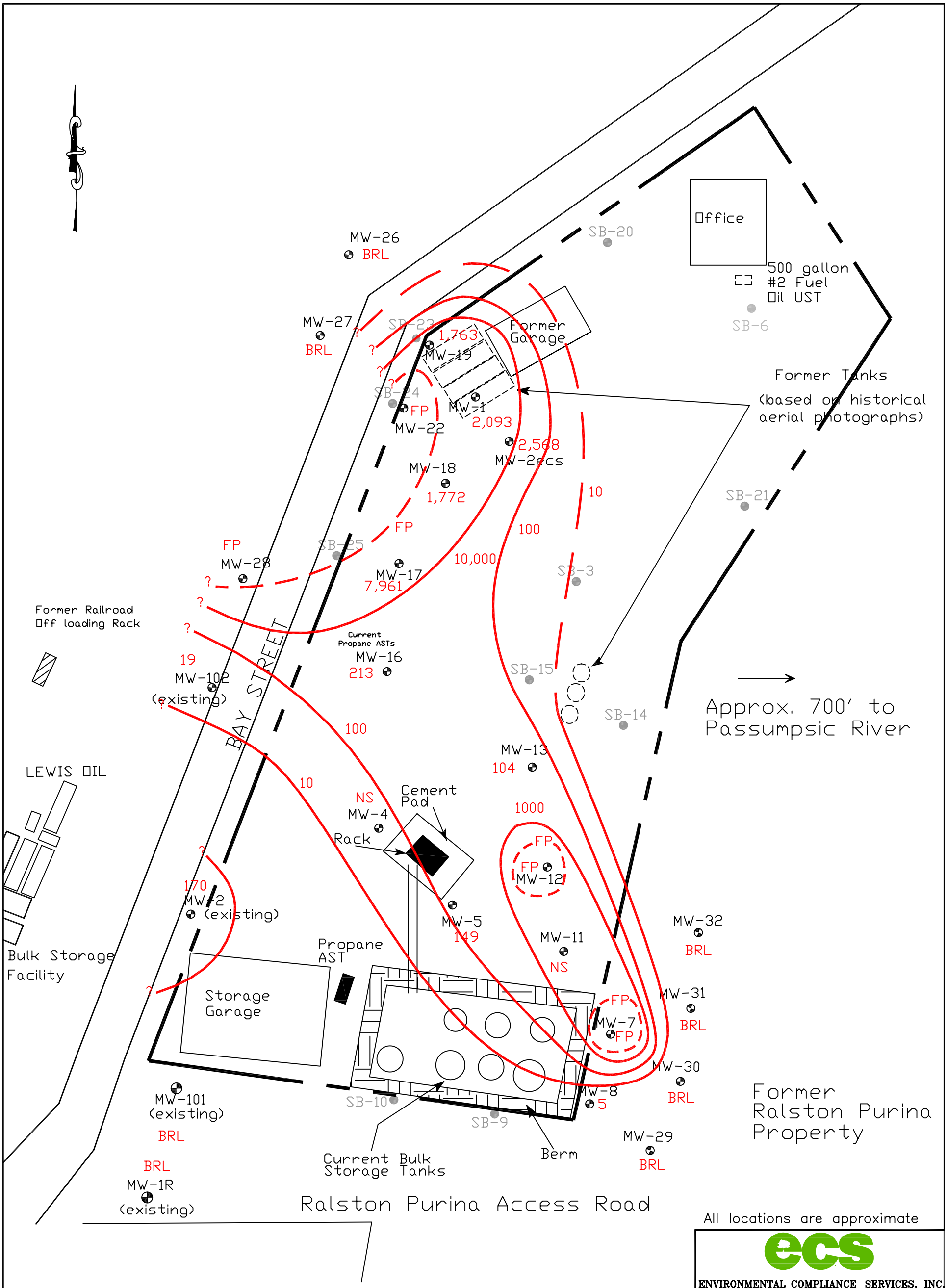
TITLE:
**Groundwater Elevation Map, 7/17/06**

CLIENT:
**Bradford Oil Company**

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: 08-204262R01

| DRAWN BY: | DESIGNED BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| KR | KL | LW | LW |
| SCALE: | DATE: | JOB NO.: | FIGURE NO.: |
| 1"= 40' | 10/12/06 | 08-204262 | 3 |




LEGEND

- PROPERTY LINE
- MW-2 — MONITORING WELL
- SB-2 — SOIL BORING LOCATIONS
- 7,961 — BTEX (Total benzene, toluene, ethyl benzene and xylenes) CONCENTRATION (ug/L)
- 10,000 — BTEX CONCENTRATION CONTOUR
- FP — FREE PRODUCT
- PROPERTY LINE

Sampling was completed on 18 July 2006.

0 40(ft)

ENVIRONMENTAL COMPLIANCE SERVICES, INC.
65 Millet Street, Suite 301 * Richmond, VT 05477

PROJECT:
Northern Petroleum Bulk Facility
521 Bay Street
St. Johnsbury, VT

TITLE:
Groundwater Contaminant Dist. Map

CLIENT:
Bradford Oil Company

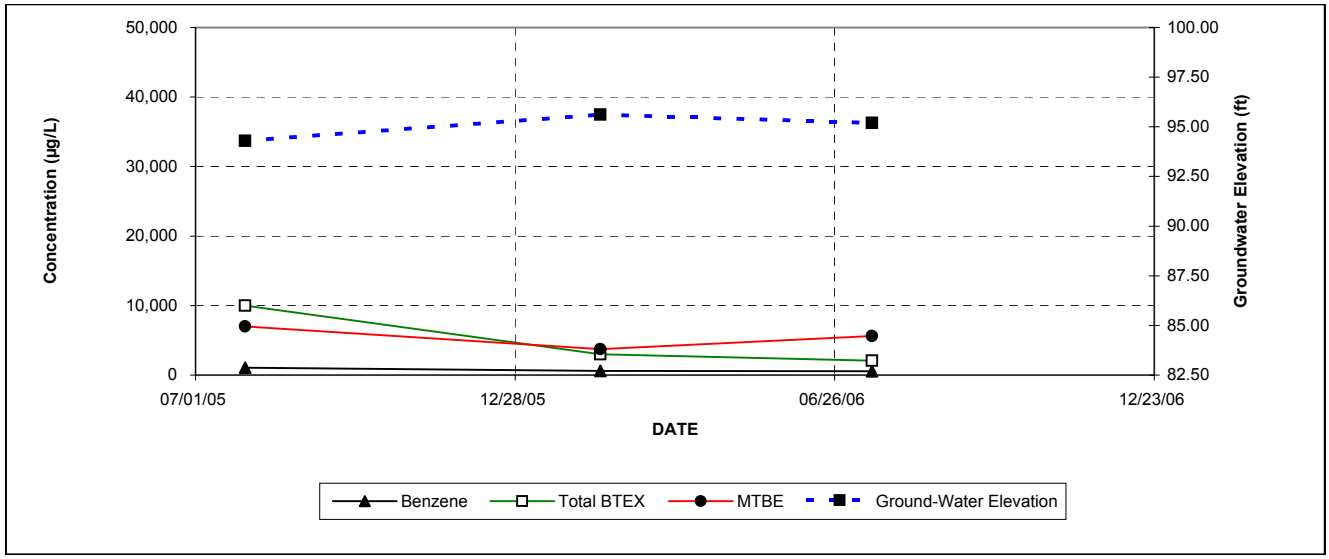
GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE 08-204262R01

| DRAWN BY: | DESIGNED BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|
| KR | KL | LW | LW |
| SCALE: | DATE: | JOB NO.: | FIGURE NO.: |
| 1"= 40' | 12/7/05 | 08-204262 | 4 |

**FIGURE 5. MW-1**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

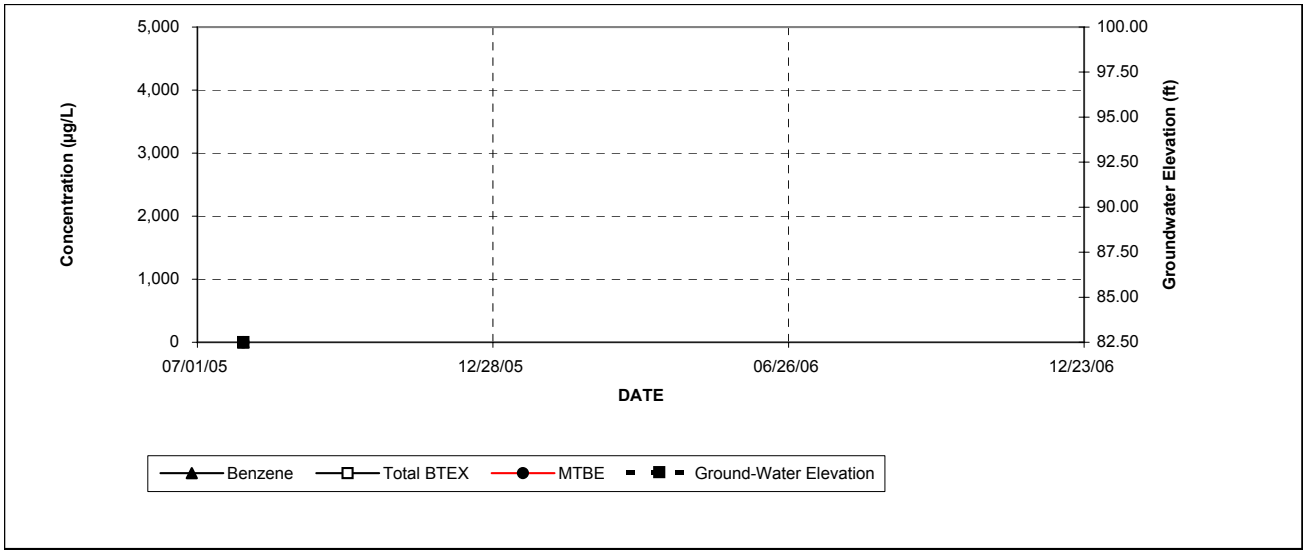



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **1,060** | **433** | **1,560** | **6,920** | **9,973** | **6,980** | **507** | **1,830** | **632** | 94.29 |
| 02/14/06 | **608** | **110** | **403** | **1,884** | **3,005** | **3,740** | **142** | **539** | **160** | 95.62 |
| 07/17/06 | **536** | **142** | **263** | **1,152** | **2,093** | **5,620** | **65.5** | **230** | **90.0** | 95.20 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 6. MW-1R Existing**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

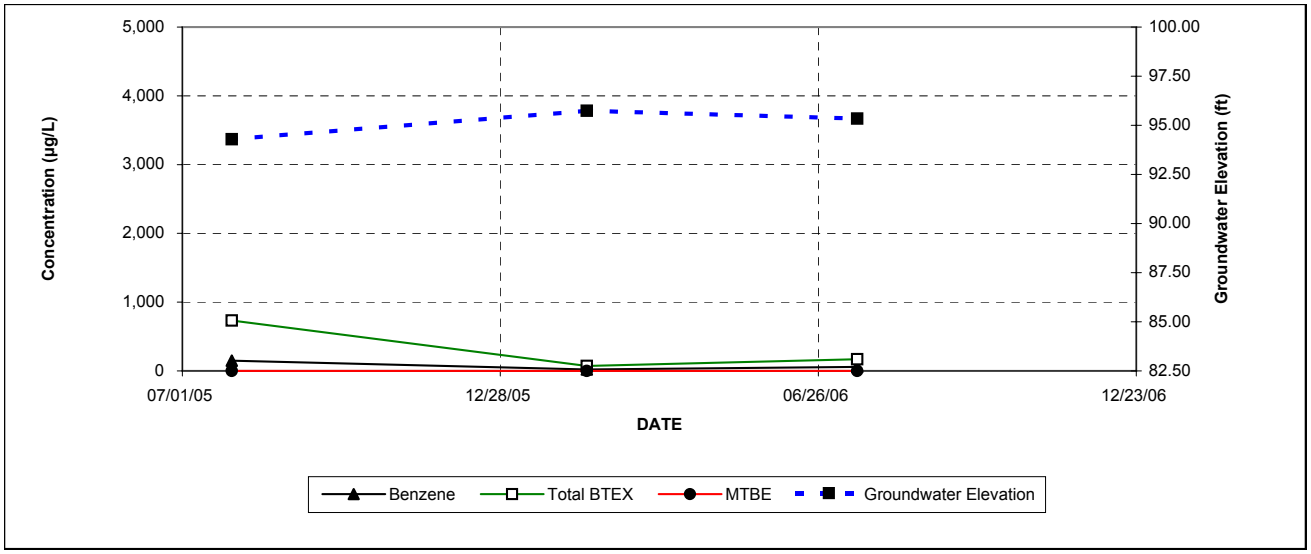



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | - |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | - |
| 07/17/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | - |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not Sampled

**FIGURE 7. MW-2 Existing**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

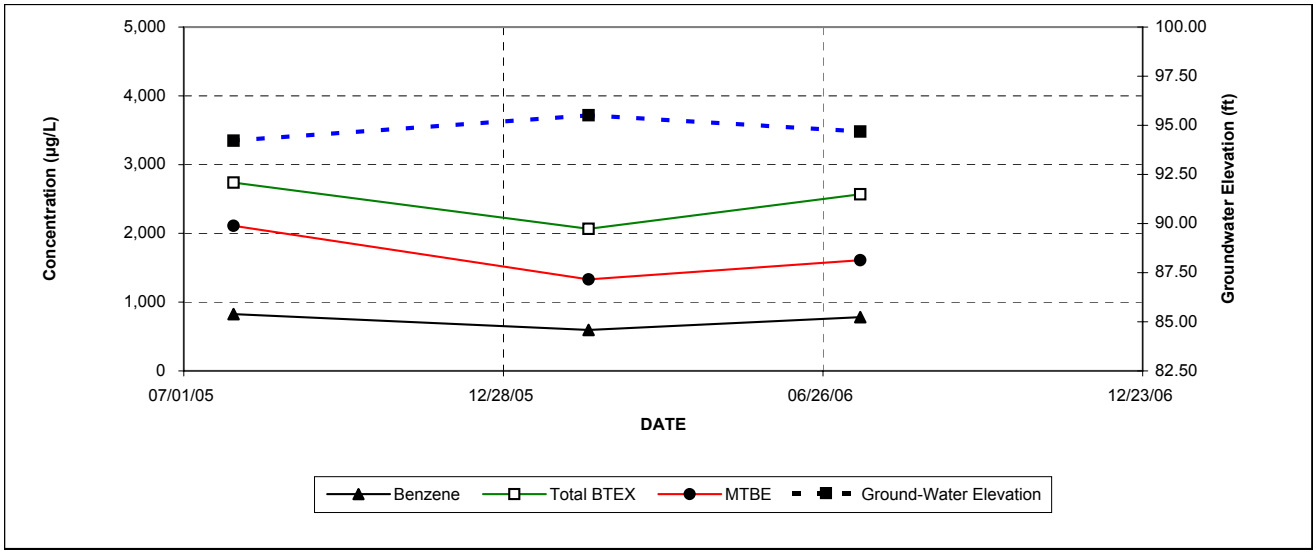



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **150** | **25.7** | **121** | **437** | **733.7** | BRL<10.0 | **41.3** | **126** | **50.6** | 94.29 |
| 02/15/06 | **19.9** | **4.0** | **20.7** | **27.3** | **71.9** | BRL<1.0 | **4.6** | **14.0** | **3.3** | 95.74 |
| 07/18/06 | **58.4** | **8.4** | **37.2** | **65.8** | **169.8** | BRL<1.0 | **12.0** | **40.0** | **12.4** | 95.34 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 8. MW-2 ECS**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

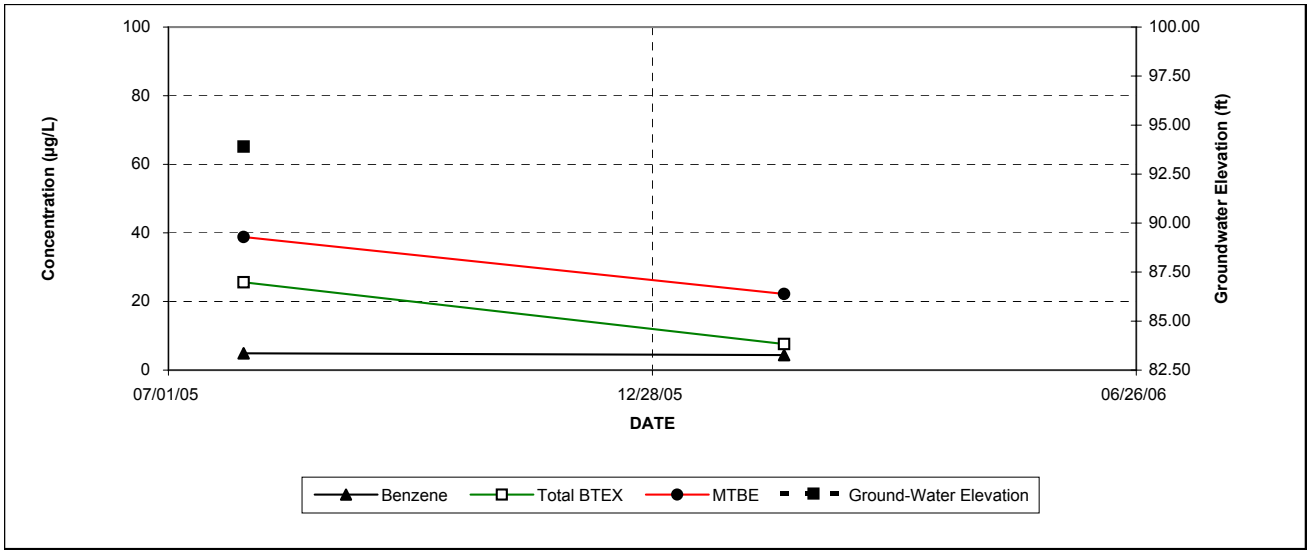



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **827** | **93** | **398** | **1,420** | **2,738** | **2,110** | **136** | **416** | **304** | 94.22 |
| 02/14/06 | **596** | **70.0** | **380** | **1,020.5** | **2,067** | **1,330** | **72.5** | **286** | **111** | 95.51 |
| 07/17/06 | **782** | **94.5** | **450** | **1,241.0** | **2,567.5** | **1,610** | **74.0** | **270** | **132** | 94.68 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 9. MW-4**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

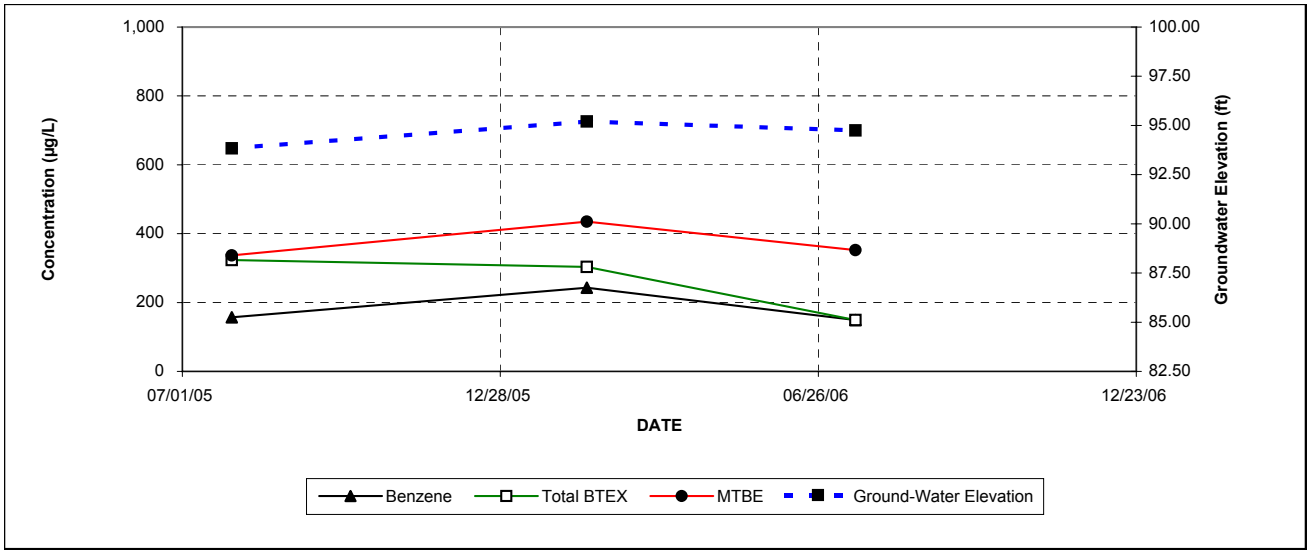



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **4.9** | **4.6** | **2.0** | **14.1** | **25.6** | **38.8** | **2.5** | **7.5** | **1.3** | 93.90 |
| 02/15/06 | **4.4** | BRL<1.0 | BRL<1.0 | **3.2** | **7.6** | **22.2** | BRL<1.0 | **2.5** | **1.4** | -- |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 10. MW-5**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

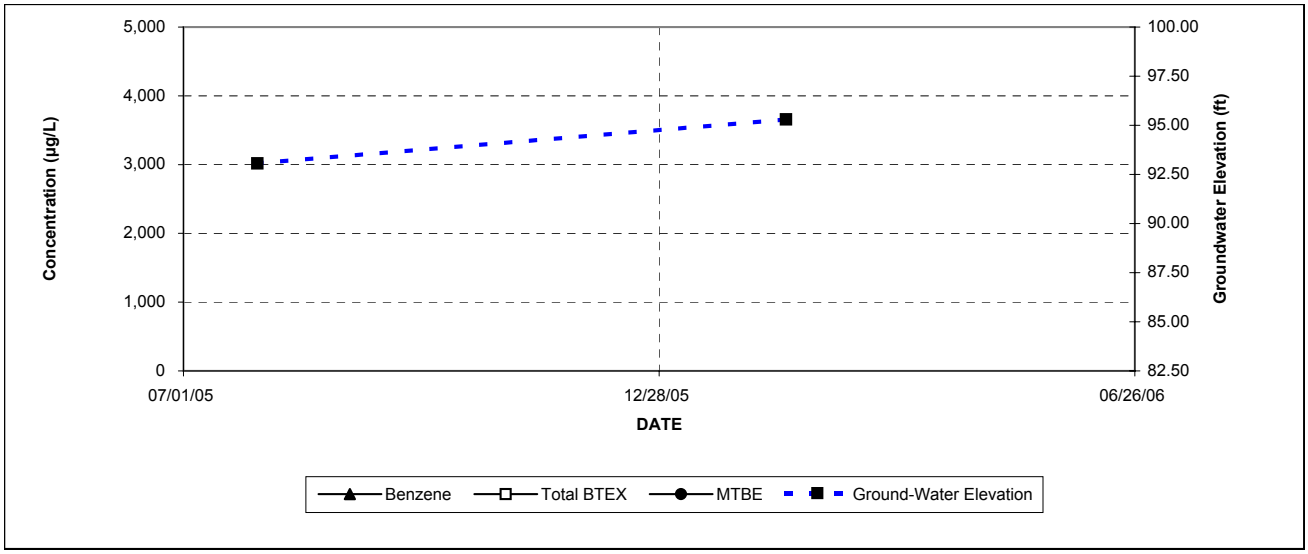



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **157** | BRL<5.0 | **21.6** | **145** | **323.6** | **337** | **55.6** | **159** | **93.7** | 93.84 |
| 02/15/06 | **243** | BRL<5.0 | **10.7** | **49.7** | **303.4** | **435** | **19.2** | **63.8** | **26.6** | 95.20 |
| 07/17/06 | **149** | BRL<5.0 | BRL<5.0 | BRL<15.0 | **149** | **352** | BRL<5.0 | **20.5** | **12.8** | 94.75 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 11. MW-7**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

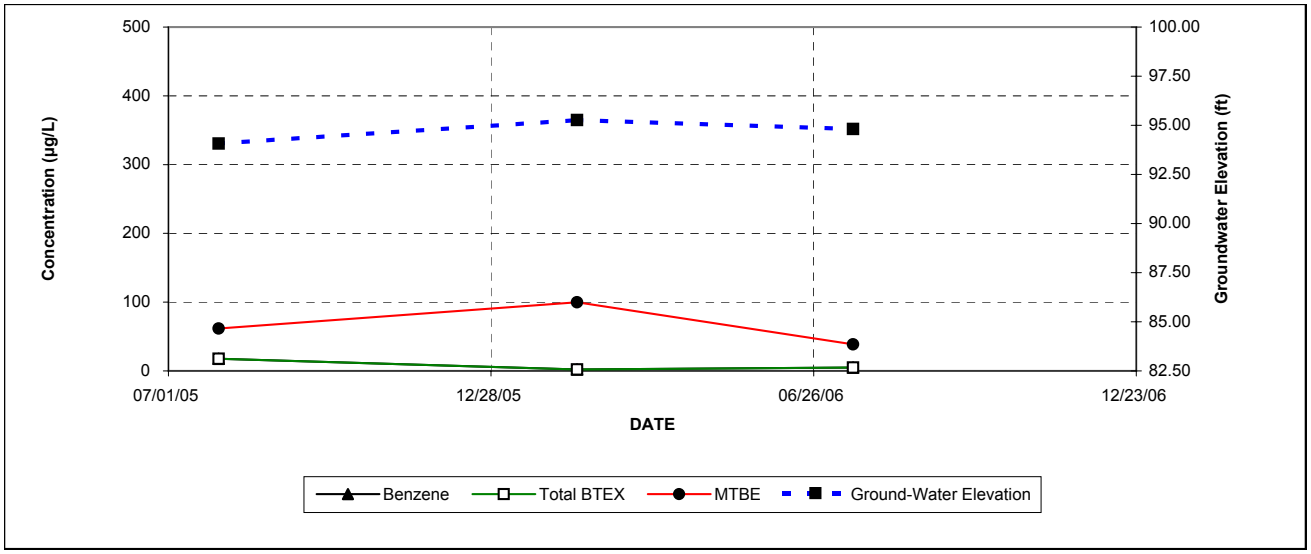



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | NS | NS | NS | NS | NS | NS | NS | NS | NS | 93.06 |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | 95.30 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not sampled due to free-phase product in well.

**FIGURE 12. MW-8**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

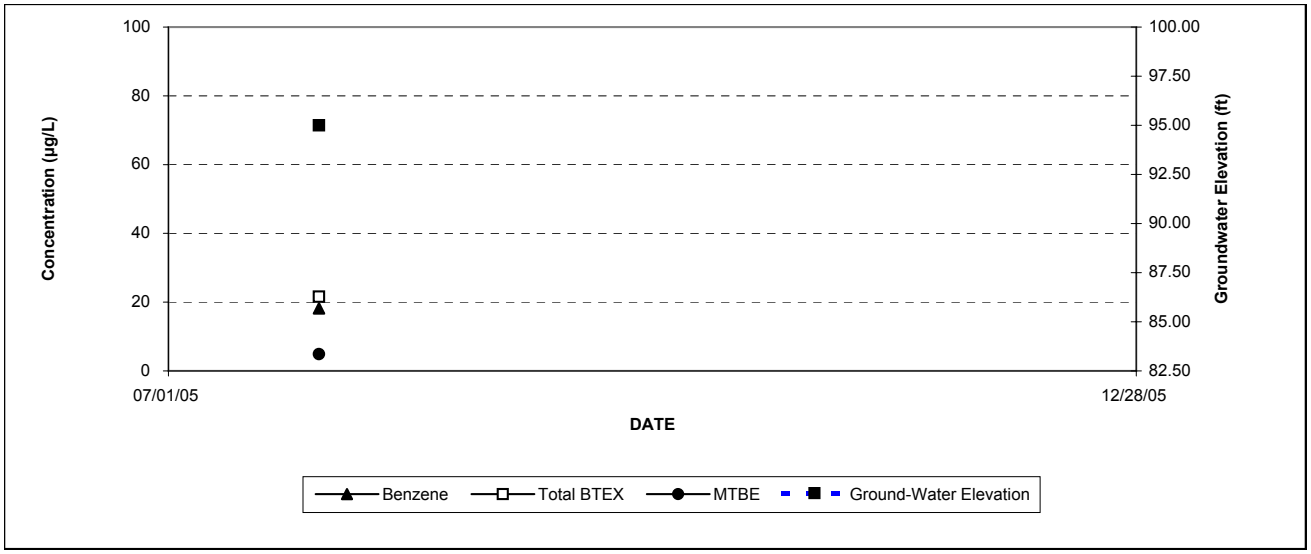



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **17.7** | BRL<1.0 | BRL<1.0 | BRL<2.0 | **17.7** | **61.6** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 94.07 |
| 02/14/06 | **2.2** | BRL<1.0 | BRL<1.0 | BRL<2.0 | **2.2** | **99.8** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.27 |
| 07/18/06 | **5.0** | BRL<1.0 | BRL<1.0 | BRL<3.0 | **5.0** | **38.6** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 94.81 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 13. MW-11**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

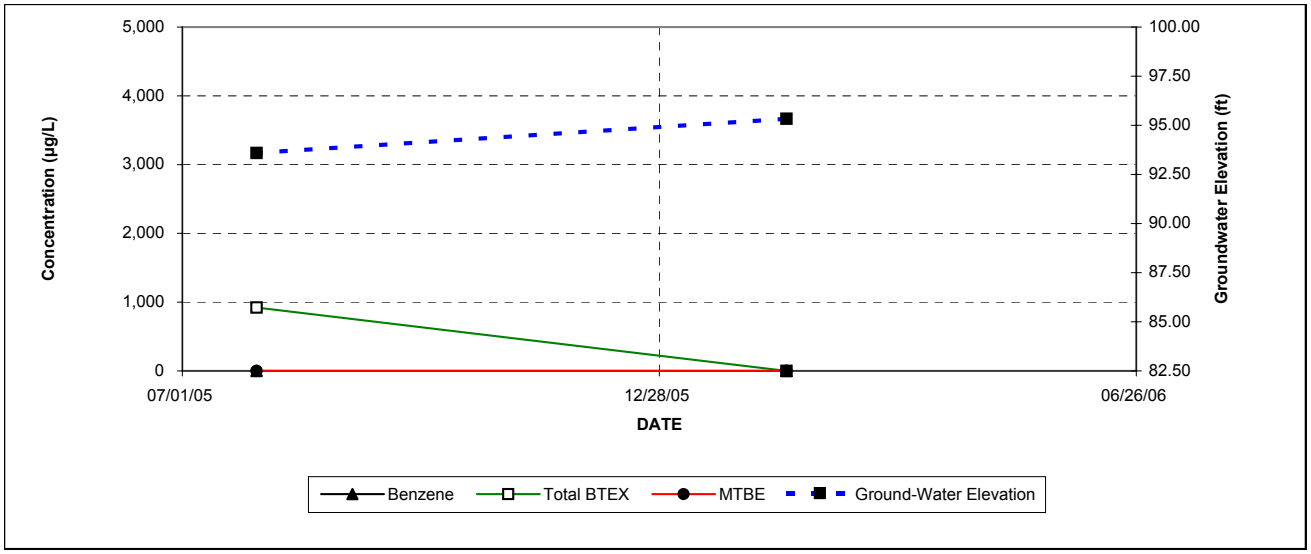



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **18.2** | BRL<1.0 | **1.3** | **2.1** | **21.6** | **4.9** | **3.4** | **50.6** | BRL<1.0 | 95.00 |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | -- |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 14. MW-12**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

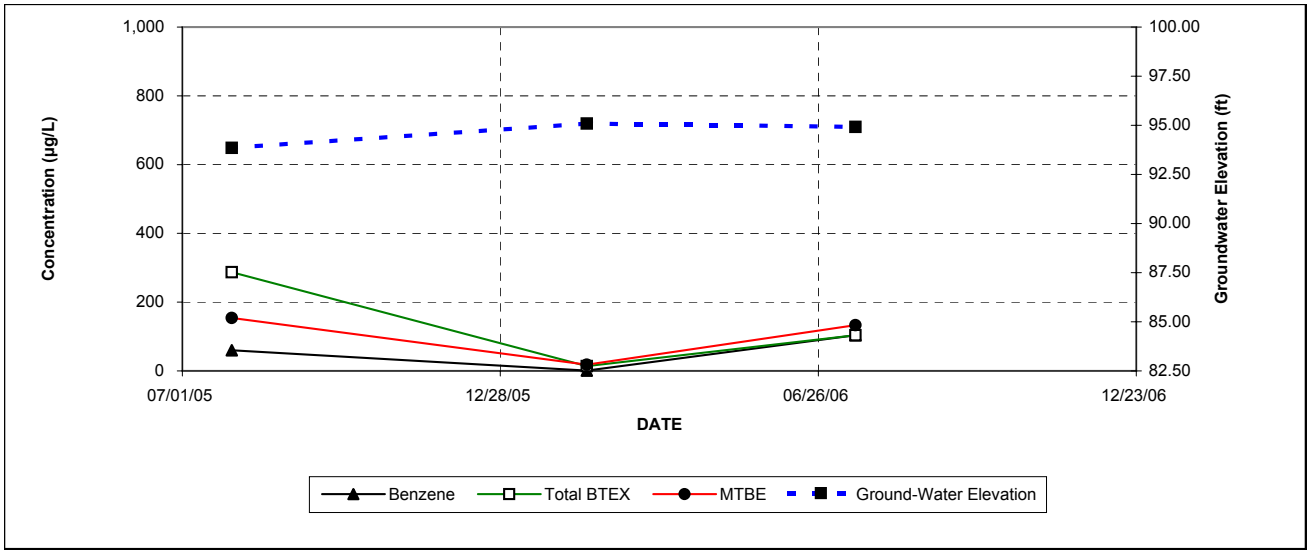



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<10.0 | BRL<10.0 | **162** | **758.7** | **920.7** | BRL<10.0 | **252** | **760** | **438** | 93.59 |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | 95.33 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not sampled due to free-phase product in well.

**FIGURE 15. MW-13**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

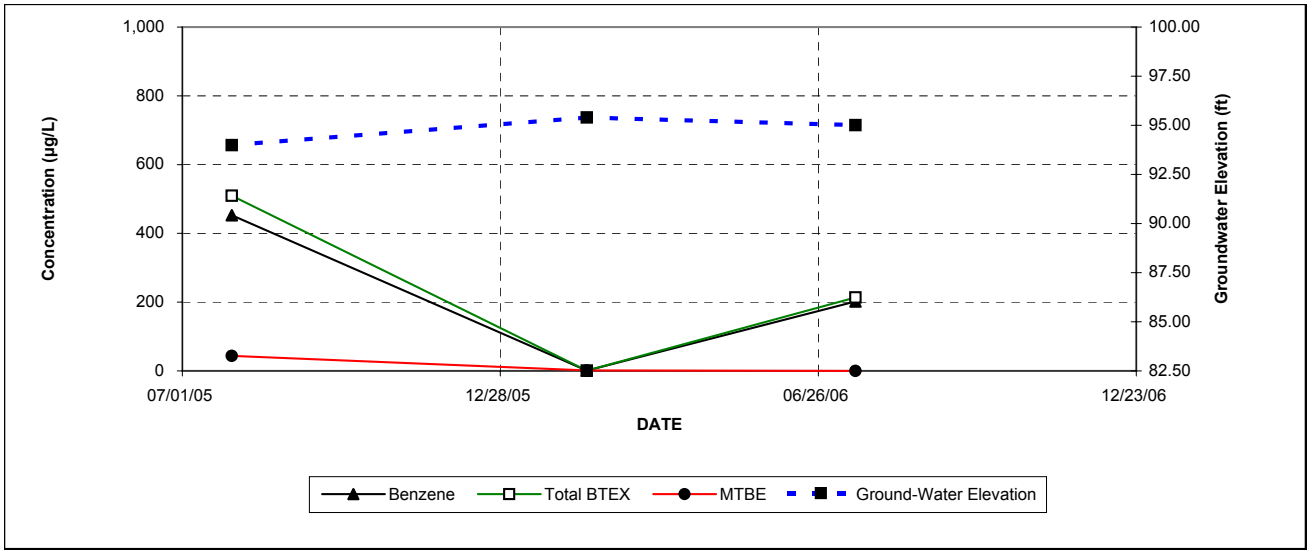



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **60.2** | BRL<5.0 | **29.0** | **198.1** | **287.3** | **154** | **135** | **313** | **103** | 93.85 |
| 02/15/06 | **1.0** | BRL<1.0 | **2.7** | **10.2** | **13.9** | **18.1** | **12.8** | **26.8** | **8.0** | 95.09 |
| 07/17/06 | **104** | BRL<1.0 | BRL<1.0 | BRL<3.0 | **104** | **133** | BRL<1.0 | **1.1** | BRL<1.0 | 94.92 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 16. MW-16**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

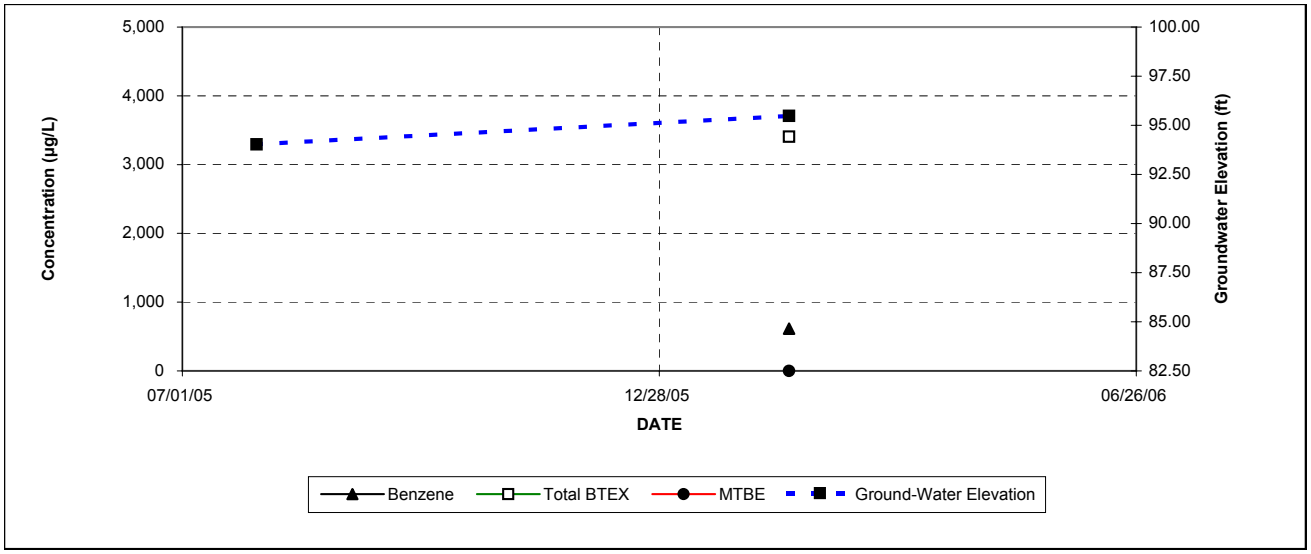



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **453** | **5.8** | **11.1** | **39.6** | **509.5** | **43.8** | **64.6** | **177** | **224** | 93.99 |
| 02/15/06 | **1.1** | BRL<1.0 | BRL<1.0 | BRL<2.0 | **1.1** | **1.3** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.40 |
| 07/17/06 | **202** | BRL<5.0 | BRL<5.0 | **11.4** | **213.4** | BRL<5.0 | **18.2** | **48.5** | **47.2** | 95.01 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 17. MW-17**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

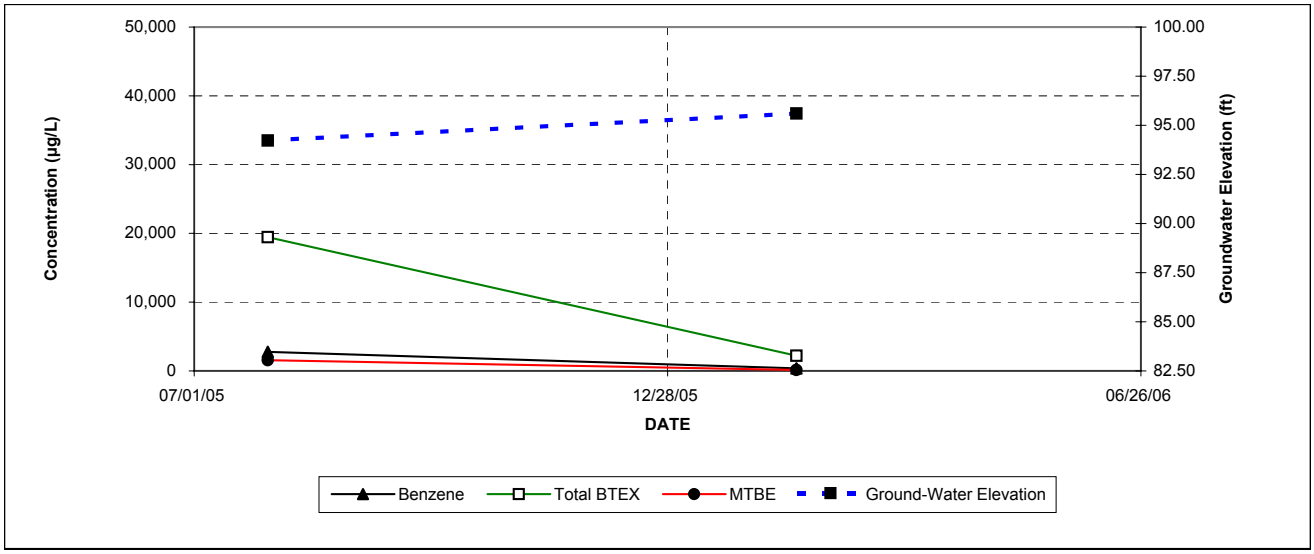



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | NS | NS | NS | NS | NS | NS | NS | NS | NS | 94.03 |
| 02/15/06 | **614** | **543** | **309** | **1,940** | **3,406** | BRL<10.0 | **244** | **802** | **188** | 95.48 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not sampled due to free-phase product in well.

**FIGURE 18. MW-18**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

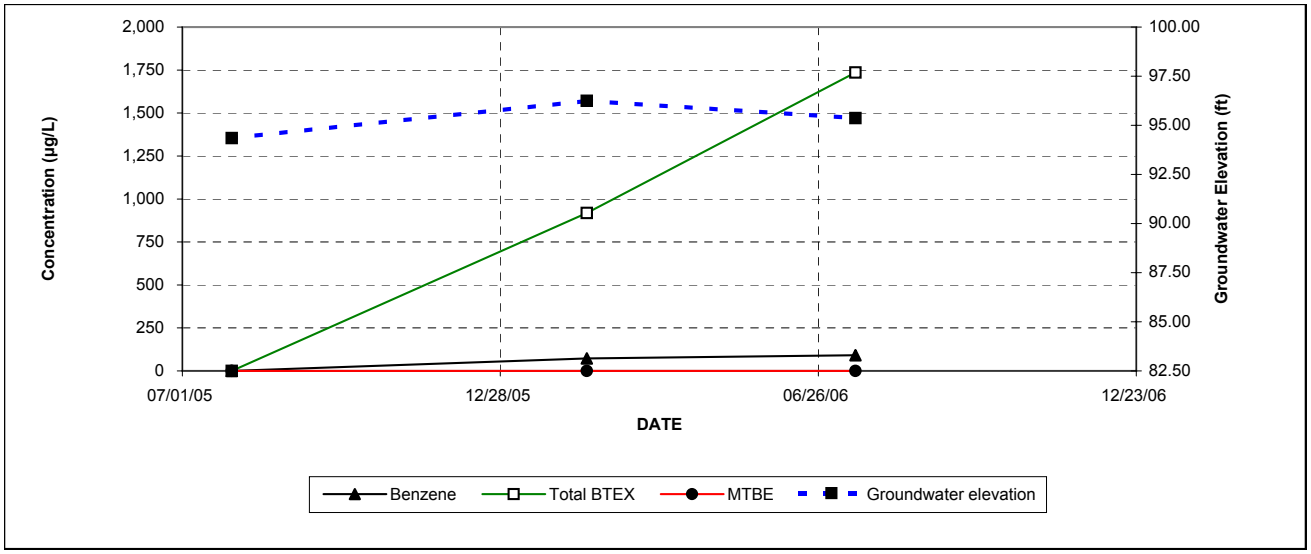



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **2,770** | **6,290** | **1,310** | **9,070** | **19,440** | **1,570** | **905** | **3,230** | **824** | 94.23 |
| 02/15/06 | **373** | **601** | **141** | **1,098** | **2,213** | **130** | **102** | **347** | **52.4** | 95.60 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 19. MW-19**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

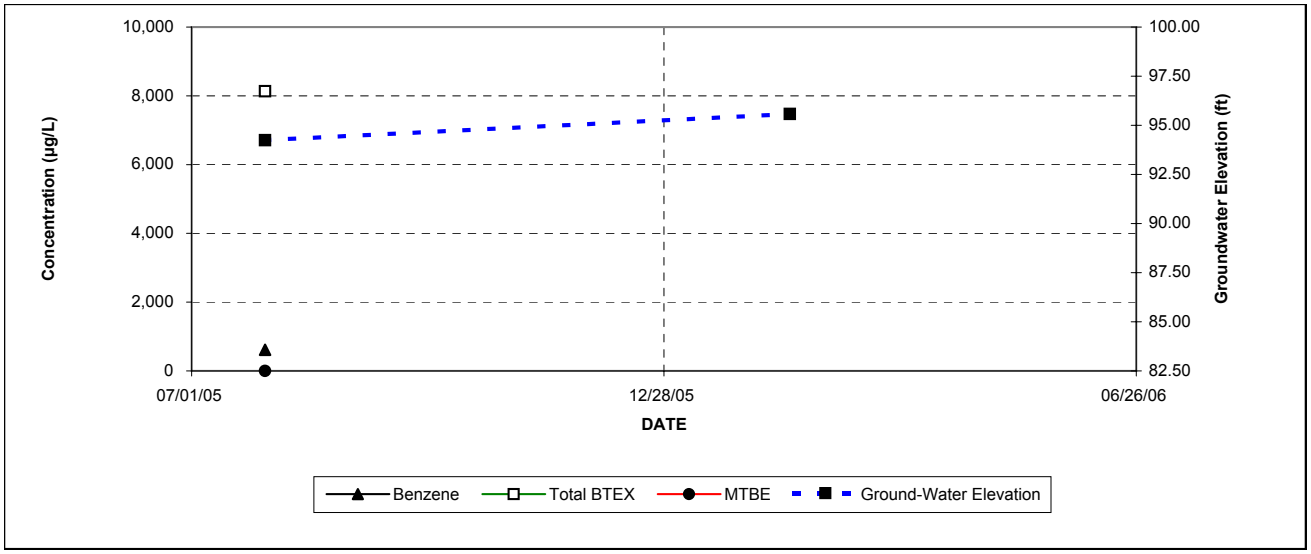



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | NS | NS | NS | NS | NS | NS | NS | NS | NS | 94.35 |
| 02/15/06 | **72.9** | **16.5** | **179** | **650.6** | **919** | BRL<5.0 | **289** | **748** | **83.0** | 96.25 |
| 07/17/06 | **91.6** | **460** | **233** | **951** | **1,736** | BRL<5.0 | **66.5** | **248** | **84.6** | 95.37 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not sampled due to free-phase product in well.

**FIGURE 20. MW-22**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

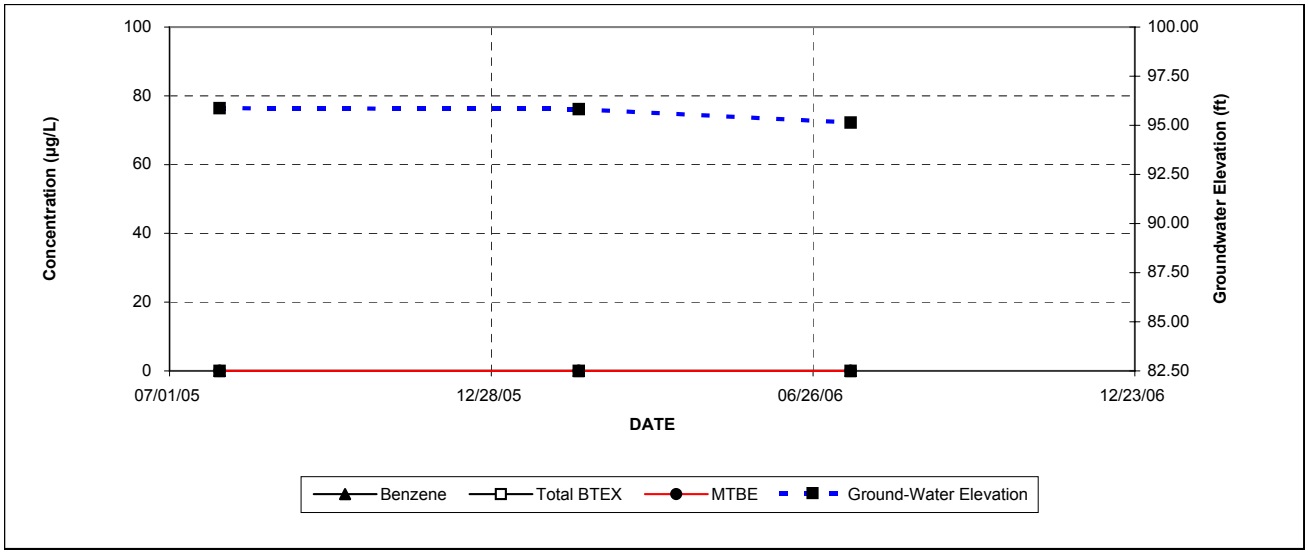



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | **616** | **1,450** | **1,050** | **5,016** | **8,132** | BRL<50 | **363** | **1,310** | **352** | 94.24 |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | 95.58 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not sampled due to free-phase product in well.

**FIGURE 21. MW-26**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

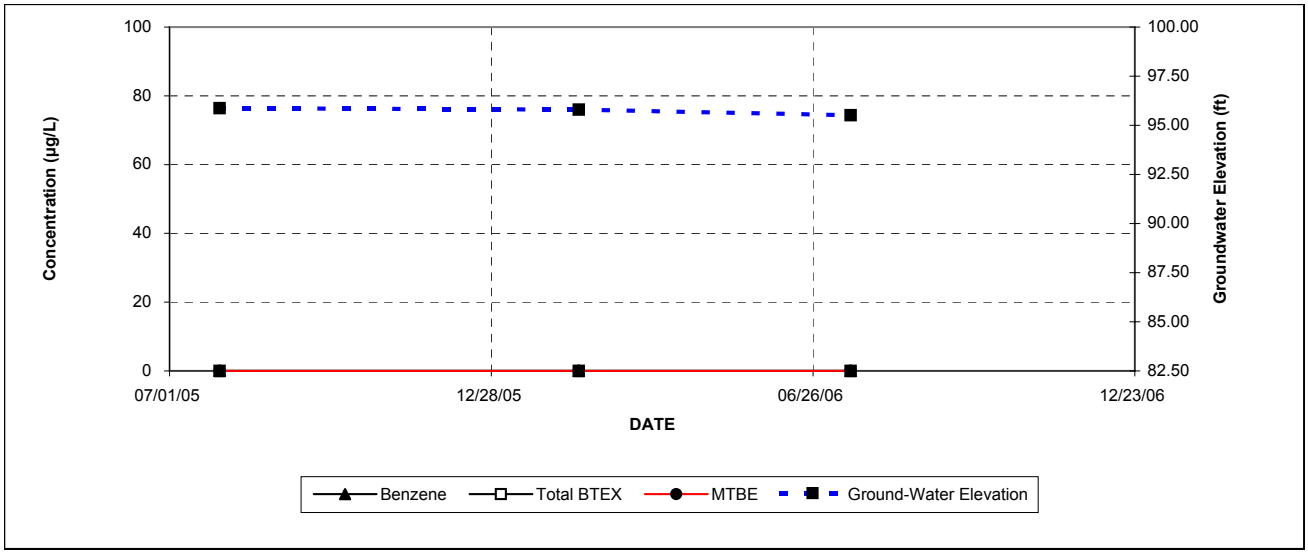



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<5.0 | 95.87 |
| 02/15/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.82 |
| 07/17/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.14 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 22. MW-27**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

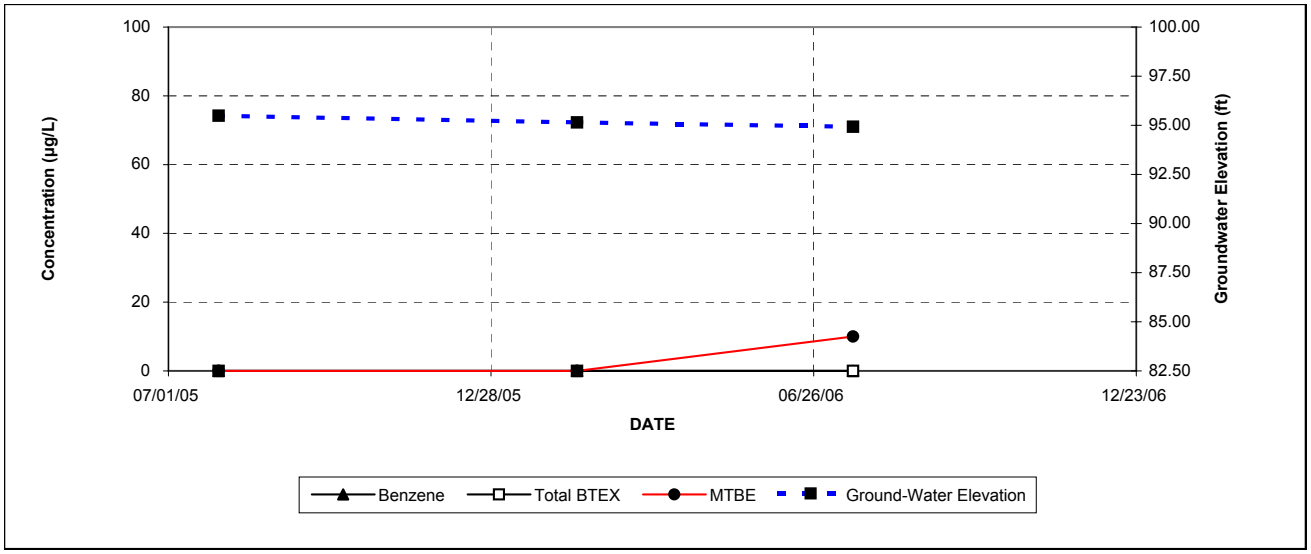



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<5.0 | 95.87 |
| 02/15/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.80 |
| 07/17/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.51 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 23. MW-29**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

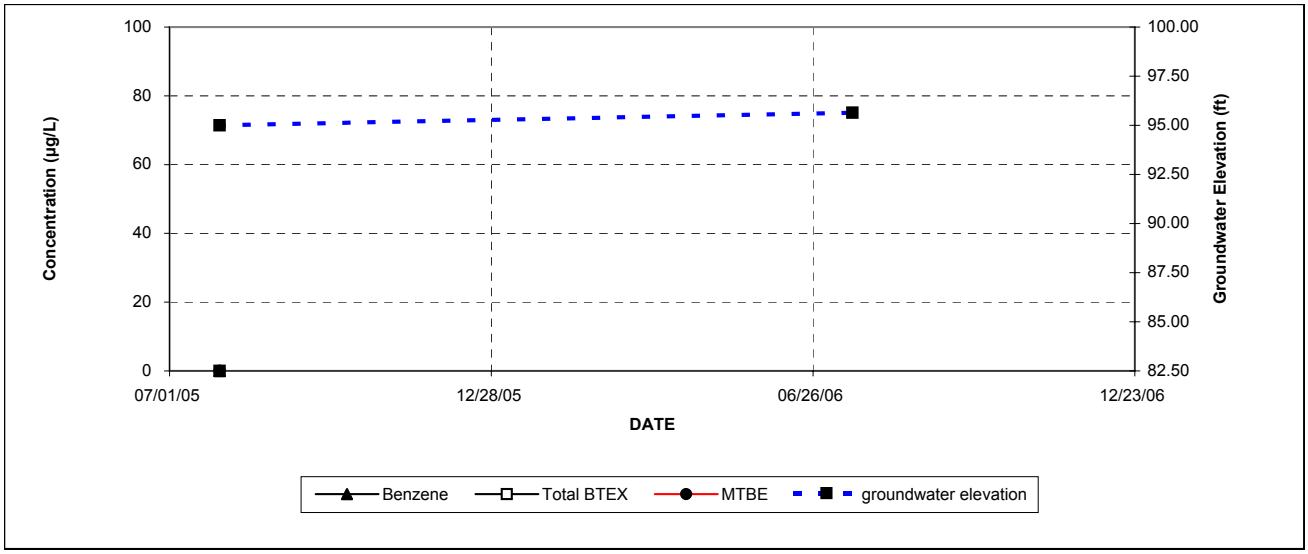



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<5.0 | 95.49 |
| 02/14/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.15 |
| 07/18/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | **10.0** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 94.93 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 24. MW- 30**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

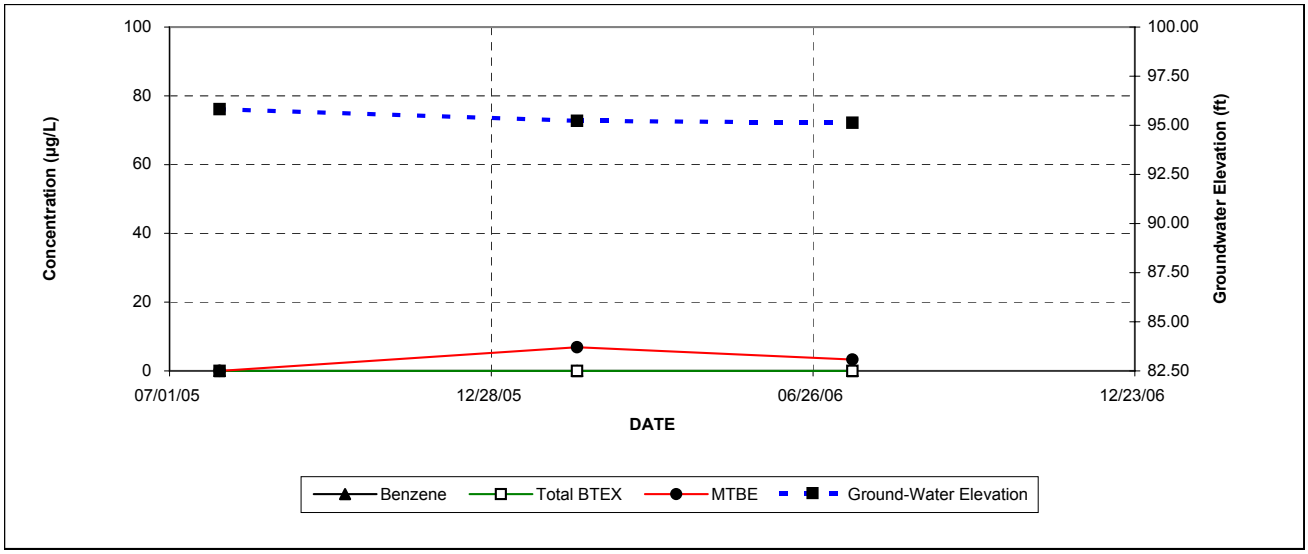



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | **1.1** | **2.0** | **2.2** | 95.64 |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | -- |
| 07/18/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | **3.8** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.00 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
Not Sampled. Removed from Sampling Plan.

**FIGURE 25. MW- 31**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

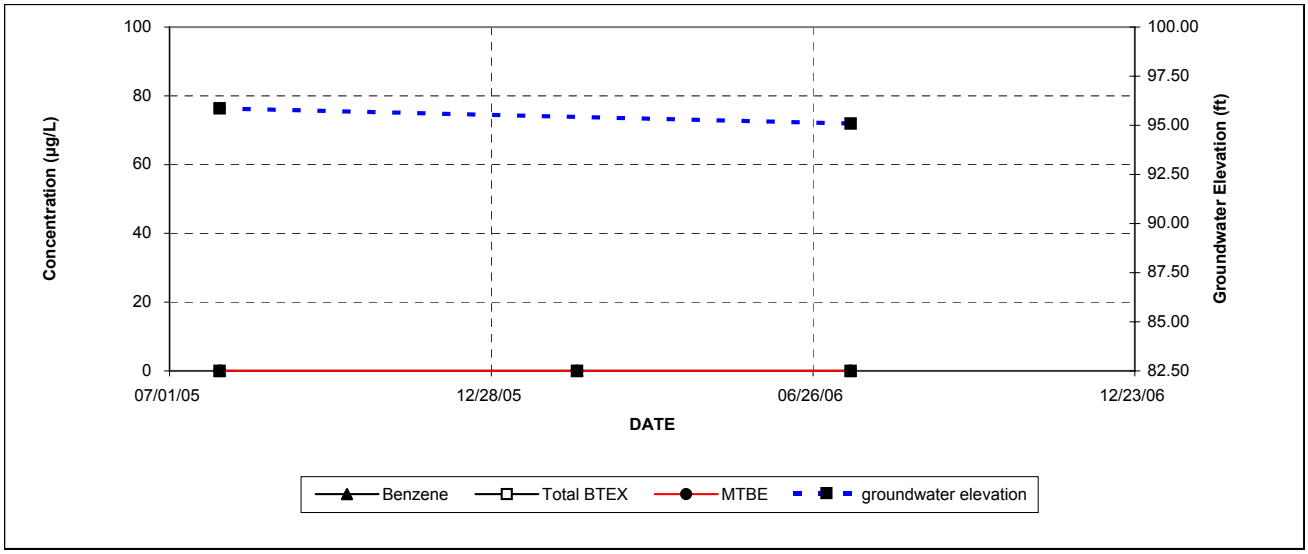



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<5.0 | 95.82 |
| 02/14/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | **6.9** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.23 |
| 07/18/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | **3.3** | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.13 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.

**FIGURE 26. MW- 32**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

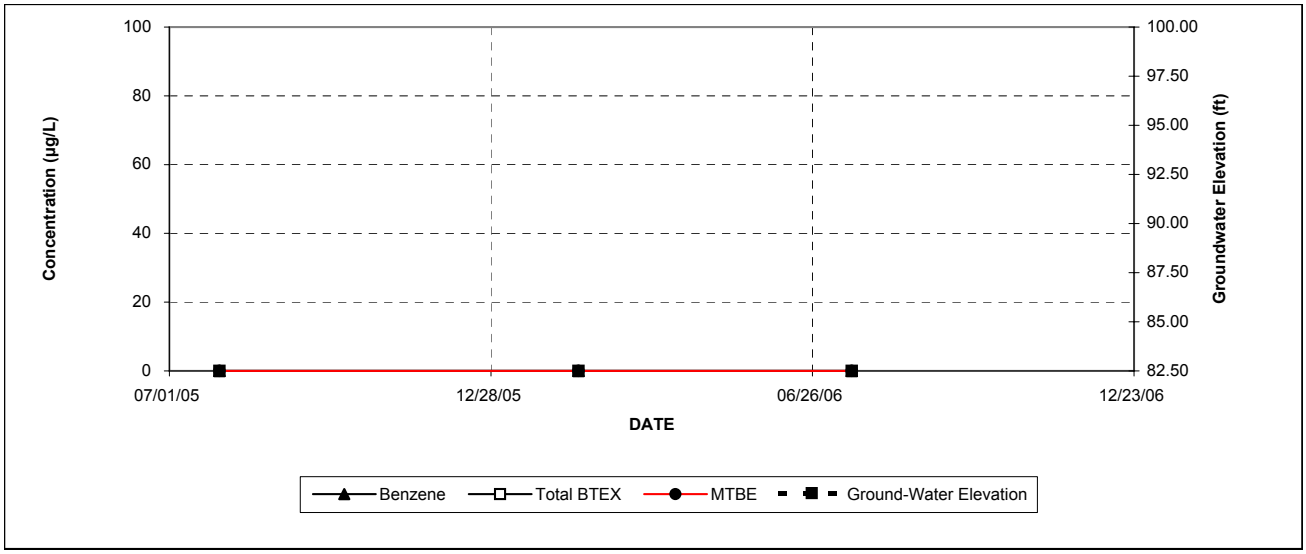



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<5.0 | 95.86 |
| 02/14/06 | NS | NS | NS | NS | NS | NS | NS | NS | NS | -- |
| 07/17/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | 95.09 |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
Not Sampled. Removed from Sampling Plan.

**FIGURE 27. MW-101**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT

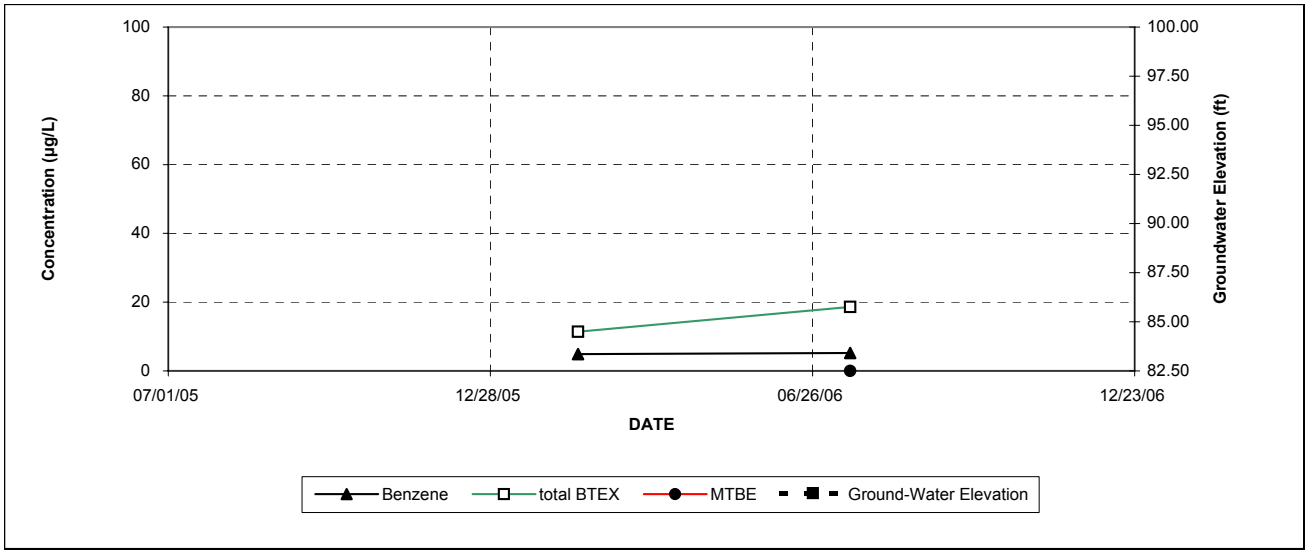



| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | - |
| 02/15/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<2.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | - |
| 07/18/06 | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<3.0 | BRL | BRL<1.0 | BRL<1.0 | BRL<1.0 | BRL<1.0 | - |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
Well not surveyed in.

**FIGURE 28. MW-102**
**VOC Concentrations**

Northern Petroleum Bulk Storage Plant
St. Johnsbury, VT




| Date | Benzene | Toluene | Ethyl benzene | Xylenes | Total BTEX | MTBE | 1,3,5 TMB | 1,2,4 TMB | Naph-thalene | Ground-Water Elevation |
|---|---|---|---|---|---|---|---|---|---|---|
| 07/29/05 | NS | NS | NS | NS | NS | NS | NS | NS | NS | - |
| 02/15/06 | **4.9** | BRL<1.0 | BRL<1.0 | **6.5** | **11.4** | BRL<1.0 | **1.3** | **2.2** | **1.1** | - |
| 07/17/06 | **5.2** | **1.2** | BRL<1.0 | **13.4** | **18.6** | BRL<1.0 | **9.3** | **12.7** | **8.1** | - |
| *VGES* | *5* | *1,000* | *700* | *10,000* | -- | *40* | *4* | *5* | *20* | -- |

Notes:
Concentrations in micrograms per liter (µg/L).
MTBE - methyl tert-butyl ether
TMB - trimethyl benzene
BRL - Below Reporting Limit
VGES - Vermont Groundwater Enforcement Standards
Shaded areas indicate VGES exceedances.
NS - Not Sampled. Well not included in initial sampling plan.
Well not surveyed in.

# APPENDIX A
# LABORATORY ANALYTICAL REPORTS

Report Date:
03-Aug-06 16:43

☑ Final Report
☐ Re-Issued Report
☐ Revised Report

**SPECTRUM ANALYTICAL, INC.**
***Featuring***
**HANIBAL TECHNOLOGY**

# *Laboratory Report*

Environmental Compliance Services
65 Millet Street; Suite 301
Richmond, VT 05477
Attn: Laura Woodard

Project: N. Petroleum - St. Johnsbury, VT
Project 08-204262.00

| Laboratory ID | Client Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SA48439-01 | Trip Blank | Ground Water | 17-Jul-06 08:15 | 20-Jul-06 10:15 |
| SA48439-02 | MW-5 | Ground Water | 17-Jul-06 11:45 | 20-Jul-06 10:15 |
| SA48439-03 | MW-13 | Ground Water | 17-Jul-06 12:05 | 20-Jul-06 10:15 |
| SA48439-04 | MW-1 | Ground Water | 17-Jul-06 14:55 | 20-Jul-06 10:15 |
| SA48439-05 | MW-16 | Ground Water | 17-Jul-06 12:45 | 20-Jul-06 10:15 |
| SA48439-06 | DUP | Ground Water | 17-Jul-06 12:45 | 20-Jul-06 10:15 |
| SA48439-07 | MW-19 | Ground Water | 17-Jul-06 15:50 | 20-Jul-06 10:15 |
| SA48439-08 | MW-2 ECS | Ground Water | 17-Jul-06 16:05 | 20-Jul-06 10:15 |
| SA48439-09 | MW-26 | Ground Water | 17-Jul-06 17:15 | 20-Jul-06 10:15 |
| SA48439-10 | MW-27 | Ground Water | 17-Jul-06 17:25 | 20-Jul-06 10:15 |
| SA48439-11 | MW-102 | Ground Water | 17-Jul-06 18:20 | 20-Jul-06 10:15 |

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.
Please note that this report contains 10 pages of analytical data plus Chain of Custody document(s).
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Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New Jersey # MA011/MA012
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393

Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

*Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.*

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **Trip Blank**<br>SA48439-01 | 08-204262.00 | Ground Water | 17-Jul-06 08:15 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *95.3* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *96.0* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *103* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-5**<br>SA48439-02 | 08-204262.00 | Ground Water | 17-Jul-06 11:45 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 149 | | µg/l | 5.0 | 5 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 352 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 12.8 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 20.5 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 10.0 | 5 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *98.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *97.7* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *104* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-13**<br>SA48439-03 | 08-204262.00 | Ground Water | 17-Jul-06 12:05 | 20-Jul-06 |

| *CAS No.* | *Analyte(s)* | *Result* | *Flag* | *Units* | **RDL* | *Dilution* | *Method Ref.* | *Prepared* | *Analyzed* | *Batch* | *Analyst* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 104 | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 133 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 1.1 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *95.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *96.3* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *107* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *102* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-1**<br>SA48439-04 | 08-204262.00 | Ground Water | 17-Jul-06 14:55 | 20-Jul-06 |

| *CAS No.* | *Analyte(s)* | *Result* | *Flag* | *Units* | **RDL* | *Dilution* | *Method Ref.* | *Prepared* | *Analyzed* | *Batch* | *Analyst* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 536 | | µg/l | 50.0 | 50 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | 263 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 5,620 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 90.0 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 108-88-3 | Toluene | 142 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 230 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 65.5 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 1,000 | | µg/l | 100 | 50 | " | " | " | " | " |
| 95-47-6 | o-Xylene | 152 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *96.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *97.3* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *114* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *106* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-16**<br>SA48439-05 | 08-204262.00 | Ground Water | 17-Jul-06 12:45 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 202 | | µg/l | 5.0 | 5 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 47.2 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 48.5 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 18.2 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 11.4 | | µg/l | 10.0 | 5 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *97.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *101* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *102* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *97.0* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **DUP**<br>SA48439-06 | 08-204262.00 | Ground Water | 17-Jul-06 12:45 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 186 | | µg/l | 5.0 | 5 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 46.0 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 46.0 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 17.8 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 11.5 | | µg/l | 10.0 | 5 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *96.7* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *98.7* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *110* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *106* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-19**<br>SA48439-07 | 08-204262.00 | Ground Water | 17-Jul-06 15:50 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 91.6 | | µg/l | 5.0 | 5 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | 233 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 84.6 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-88-3 | Toluene | 460 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 248 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 66.5 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 801 | | µg/l | 10.0 | 5 | " | " | " | " | " |
| 95-47-6 | o-Xylene | 150 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *99.3* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *98.3* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *104* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-2 ECS**<br>SA48439-08 | 08-204262.00 | Ground Water | 17-Jul-06 16:05 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 782 | | µg/l | 25.0 | 50 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | 450 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 1,610 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 132 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| 108-88-3 | Toluene | 94.5 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 270 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 74.0 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 1,210 | | µg/l | 50.0 | 50 | " | " | " | " | " |
| 95-47-6 | o-Xylene | 31.0 | | µg/l | 25.0 | 50 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *98.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *96.7* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *113* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *104* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-26**<br>SA48439-09 | 08-204262.00 | Ground Water | 17-Jul-06 17:15 | 20-Jul-06 |

| *CAS No.* | *Analyte(s)* | *Result* | *Flag* | *Units* | **RDL* | *Dilution* | *Method Ref.* | *Prepared* | *Analyzed* | *Batch* | *Analyst* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *101* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *96.7* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *105* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *100* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-27**<br>SA48439-10 | 08-204262.00 | Ground Water | 17-Jul-06 17:25 | 20-Jul-06 |

| *CAS No.* | *Analyte(s)* | *Result* | *Flag* | *Units* | **RDL* | *Dilution* | *Method Ref.* | *Prepared* | *Analyzed* | *Batch* | *Analyst* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *97.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *98.7* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *113* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *103* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-102**<br>SA48439-11 | 08-204262.00 | Ground Water | 17-Jul-06 18:20 | 20-Jul-06 |

| *CAS No.* | *Analyte(s)* | *Result* | *Flag* | *Units* | **RDL* | *Dilution* | *Method Ref.* | *Prepared* | *Analyzed* | *Batch* | *Analyst* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 5.2 | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071635 | ek |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 8.1 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | 1.2 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 12.7 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 9.3 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 13.4 | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *104* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *98.3* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *112* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *105* | | *70-130 %* | | | " | " | " | " | " |

## Volatile Organic Compounds - Quality Control

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6071635 - SW846 5030 Water MS** | | | | | | | | | | |
| **Blank (6071635-BLK1)** | | | | | | | | | | |
| Prepared: 26-Jul-06 Analyzed: 27-Jul-06 | | | | | | | | | | |
| Benzene | BRL | | µg/l | 1.0 | | | | | | |
| Chlorobenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,1-Dichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| Ethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| Methyl tert-butyl ether | BRL | | µg/l | 1.0 | | | | | | |
| Naphthalene | BRL | | µg/l | 1.0 | | | | | | |
| Toluene | BRL | | µg/l | 1.0 | | | | | | |
| Trichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| m,p-Xylene | BRL | | µg/l | 2.0 | | | | | | |
| o-Xylene | BRL | | µg/l | 1.0 | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *29.4* | | µg/l | | *30.0* | | *98.0* | *70-130* | | |
| *Surrogate: Toluene-d8* | *29.6* | | µg/l | | *30.0* | | *98.7* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *32.9* | | µg/l | | *30.0* | | *110* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *30.3* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| **LCS (6071635-BS1)** | | | | | | | | | | |
| Prepared: 26-Jul-06 Analyzed: 27-Jul-06 | | | | | | | | | | |
| Benzene | 18.4 | | µg/l | | 20.0 | | 92.0 | 70-130 | | 30 |
| Ethylbenzene | 16.8 | | µg/l | | 20.0 | | 84.0 | 70-130 | | 30 |
| Methyl tert-butyl ether | 21.4 | | µg/l | | 20.0 | | 107 | 70-130 | | 30 |
| Naphthalene | 18.8 | | µg/l | | 20.0 | | 94.0 | 70-130 | | 30 |
| Toluene | 17.6 | | µg/l | | 20.0 | | 88.0 | 70-130 | | 30 |
| 1,2,4-Trimethylbenzene | 16.2 | | µg/l | | 20.0 | | 81.0 | 70-130 | | 30 |
| 1,3,5-Trimethylbenzene | 16.7 | | µg/l | | 20.0 | | 83.5 | 70-130 | | 30 |
| m,p-Xylene | 33.2 | | µg/l | | 40.0 | | 83.0 | 70-130 | | 30 |
| o-Xylene | 17.8 | | µg/l | | 20.0 | | 89.0 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *29.4* | | µg/l | | *30.0* | | *98.0* | *70-130* | | |
| *Surrogate: Toluene-d8* | *28.6* | | µg/l | | *30.0* | | *95.3* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *32.8* | | µg/l | | *30.0* | | *109* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *30.9* | | µg/l | | *30.0* | | *103* | *70-130* | | |
| **LCS Dup (6071635-BSD1)** | | | | | | | | | | |
| Prepared: 26-Jul-06 Analyzed: 27-Jul-06 | | | | | | | | | | |
| Benzene | 18.0 | | µg/l | | 20.0 | | 90.0 | 70-130 | 2.20 | 30 |
| Ethylbenzene | 17.4 | | µg/l | | 20.0 | | 87.0 | 70-130 | 3.51 | 30 |
| Methyl tert-butyl ether | 20.6 | | µg/l | | 20.0 | | 103 | 70-130 | 3.81 | 30 |
| Naphthalene | 18.8 | | µg/l | | 20.0 | | 94.0 | 70-130 | 0.00 | 30 |
| Toluene | 17.7 | | µg/l | | 20.0 | | 88.5 | 70-130 | 0.567 | 30 |
| 1,2,4-Trimethylbenzene | 16.8 | | µg/l | | 20.0 | | 84.0 | 70-130 | 3.64 | 30 |
| 1,3,5-Trimethylbenzene | 17.1 | | µg/l | | 20.0 | | 85.5 | 70-130 | 2.37 | 30 |
| m,p-Xylene | 33.9 | | µg/l | | 40.0 | | 84.8 | 70-130 | 2.15 | 30 |
| o-Xylene | 18.3 | | µg/l | | 20.0 | | 91.5 | 70-130 | 2.77 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *30.2* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| *Surrogate: Toluene-d8* | *29.4* | | µg/l | | *30.0* | | *98.0* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *31.4* | | µg/l | | *30.0* | | *105* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *30.2* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| **Matrix Spike (6071635-MS1)** **Source: SA48439-11** | | | | | | | | | | |
| Prepared: 26-Jul-06 Analyzed: 27-Jul-06 | | | | | | | | | | |
| Benzene | 22.8 | | µg/l | | 20.0 | 5.25 | 87.8 | 70-130 | | 30 |
| Chlorobenzene | 17.9 | | µg/l | | 20.0 | BRL | 89.5 | 70-130 | | 30 |
| 1,1-Dichloroethene | 16.8 | | µg/l | | 20.0 | BRL | 84.0 | 70-130 | | 30 |
| Toluene | 18.2 | | µg/l | | 20.0 | 1.20 | 85.0 | 70-130 | | 30 |
| Trichloroethene | 19.3 | | µg/l | | 20.0 | BRL | 96.5 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *29.7* | | µg/l | | *30.0* | | *99.0* | *70-130* | | |

## Volatile Organic Compounds - Quality Control

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6071635 - SW846 5030 Water MS** | | | | | | | | | | |
| **Matrix Spike (6071635-MS1)** **Source: SA48439-11** | | | | | | | | | | |
| Prepared: 26-Jul-06 Analyzed: 27-Jul-06 | | | | | | | | | | |
| *Surrogate: Toluene-d8* | *29.7* | | µg/l | | *30.0* | | *99.0* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *33.6* | | µg/l | | *30.0* | | *112* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *33.0* | | µg/l | | *30.0* | | *110* | *70-130* | | |
| **Matrix Spike Dup (6071635-MSD1)** **Source: SA48439-11** | | | | | | | | | | |
| Prepared: 26-Jul-06 Analyzed: 27-Jul-06 | | | | | | | | | | |
| Benzene | 24.0 | | µg/l | | 20.0 | 5.25 | 93.8 | 70-130 | 6.61 | 30 |
| Chlorobenzene | 17.7 | | µg/l | | 20.0 | BRL | 88.5 | 70-130 | 1.12 | 30 |
| 1,1-Dichloroethene | 12.4 | QM-07 | µg/l | | 20.0 | BRL | 62.0 | 70-130 | 30.1 | 30 |
| Toluene | 17.5 | | µg/l | | 20.0 | 1.20 | 81.5 | 70-130 | 4.20 | 30 |
| Trichloroethene | 15.8 | | µg/l | | 20.0 | BRL | 79.0 | 70-130 | 19.9 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *31.7* | | µg/l | | *30.0* | | *106* | *70-130* | | |
| *Surrogate: Toluene-d8* | *30.3* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *43.2* | *S-GC* | µg/l | | *30.0* | | *144* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *37.3* | | µg/l | | *30.0* | | *124* | *70-130* | | |

## Notes and Definitions

| | |
|---|---|
| QM-07 | The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery. |
| S-GC | Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate. |
| BRL | Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit |
| dry | Sample results reported on a dry weight basis |
| NR | Not Reported |
| RPD | Relative Percent Difference |

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

SA48439 MF

SPECTRUM ANALYTICAL, INC.
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HANIBAL TECHNOLOGY

# CHAIN OF CUSTODY RECORD

Page 1 of 2

**Special Handling:**
- ☒ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS
65 Millet St. Suite 301
Richmond, VT 05477

Project Mgr.: Laura Woodard

Invoice To: _____

P.O. No.: _____ RQN: _____

Project No.: 08-204262.00
Site Name: N. Petroleum
Location: St. Johnsbury State: VT
Sampler(s): JG / KR

1=$Na_2S2O_3$ 2=HCl 3=$H_2SO_4$ 4=$HNO_3$ 5=NaOH 6=Ascorbic Acid
7=$CH_3OH$ 8= $NaHSO_4$ 9=_____ 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

| Lab Id: | Sample Id: | Date: | Time: | Type | Matrix | Preservative | Containers: # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic | Analyses: 8021b VOCs | | | | | | | | QA Reporting Notes: (check if needed) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SA48439-01 | Trip Blank | 7/17/06 | 8:15 | G | GW | 2 | 3 | | | | V | | | | | | | | |
| -02 | MW-5 | | 11:45 | | | | | | | | | | | | | | | | |
| -03 | MW-13 | | 12:05 | | | | | | | | | | | | | | | | |
| -04 | MW-1 | | 14:55 | | | | | | | | | | | | | | | | |
| -05 | MW-16 | | 12:45 | | | | | | | | | | | | | | | | |
| -06 | DUP | | 12:45 | | | | | | | | | | | | | | | | |
| -07 | MW-19 | | 15:50 | | | | | | | | | | | | | | | | |
| -08 | MW-2CCS | | 16:05 | | | | | | | | | | | | | | | | |
| -09 | MW-26 | | 17:15 | | | | | | | | | | | | | | | | |
| -10 | MW-27 | | 17:25 | | | | | | | | | | | | | | | | |

State specific reporting standards *If applicable, please list below.*

☐ Provide MCP CAM Report
Were all field QC requirements met as per MADEP CAM Section 2.0?
☐ Yes ☐ No
*(Response required for CAM report)*

☐ Fax results when available to (____) _____
☒ E-mail to LWoodard@ECSconsult.com
EDD Format _____
Condition upon receipt: ☒ Iced ☐ Ambient ☐ °C 3

| Relinquished by: | Received by: | Date: | Time: |
|---|---|---|---|
| | | 7/17/06 | 20:00 |
| Fedex | [signature] | 7/18/06 | 1015 |

48439

SPECTRUM ANALYTICAL, INC.
*Featuring*
HANIBAL TECHNOLOGY

# CHAIN OF CUSTODY RECORD

Page 2 of 2

**Special Handling:**
- ☒ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS
65 Millet St. Suite 301
Richmond, VT 05401

Project Mgr.: Laura Woodard

Invoice To: _____

P.O. No.: _____ RQN: _____

Project No.: 08-204262.00
Site Name: N. Petroleum
Location: St. Johnsbury State: VT
Sampler(s): KR, JG

1=$Na_2S_2O_3$ 2=HCl 3=$H_2SO_4$ 4=$HNO_3$ 5=NaOH 6=Ascorbic Acid
7=$CH_3OH$ 8= $NaHSO_4$ 9=_____ 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

| Lab Id: | Sample Id: | Date: | Time: | Type | Matrix | Preservative | Containers: # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic | Analyses: VT 8021B | QA Reporting Notes: (check if needed) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48439-1.1 | MW-102 | 7/17/06 | 18:20 | G | GW | 2 | 3 | | | | ✓ | |

State specific reporting standards *If applicable, please list below.*

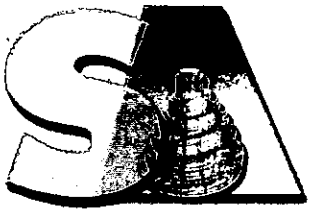
☐ Provide MCP CAM Report
Were all field QC requirements met as per MADEP CAM Section 2.0?
☐ Yes ☐ No
*(Response required for CAM report)*

☐ Fax results when available to (____) _____
☒ E-mail to Lwoodard@ecsconsult.com
EDD Format _____

Condition upon receipt: ☒ Iced ☐ Ambient ☐ °C 3

| Relinquished by: | Received by: | Date: | Time: |
|---|---|---|---|
| Heimann Ryan | | 7/17/06 | 20:00 |
| FedX | CKnowles | 7/18/06 | 1015 |

Report Date:
03-Aug-06 17:08



SPECTRUM ANALYTICAL, INC.
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HANIBAL TECHNOLOGY

☑ Final Report
☐ Re-Issued Report
☐ Revised Report

# *Laboratory Report*

Environmental Compliance Services
65 Millet Street; Suite 301
Richmond, VT 05477
Attn: Laura Woodard

Project: Northern Petroleum-St Johnsbury, VT
Project 08-204262.00

| Laboratory ID | Client Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SA48441-01 | MW-32 | Ground Water | 18-Jul-06 11:15 | 20-Jul-06 10:15 |
| SA48441-02 | MW-31 | Ground Water | 18-Jul-06 11:00 | 20-Jul-06 10:15 |
| SA48441-03 | MW-30 | Ground Water | 18-Jul-06 11:50 | 20-Jul-06 10:15 |
| SA48441-04 | MW-8 | Ground Water | 18-Jul-06 12:10 | 20-Jul-06 10:15 |
| SA48441-05 | MW-101 | Ground Water | 18-Jul-06 13:10 | 20-Jul-06 10:15 |
| SA48441-06 | MW-29 | Ground Water | 18-Jul-06 12:40 | 20-Jul-06 10:15 |
| SA48441-07 | MW-2 | Ground Water | 18-Jul-06 13:22 | 20-Jul-06 10:15 |
| SA48441-08 | MW-1R | Ground Water | 18-Jul-06 14:12 | 20-Jul-06 10:15 |

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met
Please note that this report contains 9 pages of analytical data plus Chain of Custody document(s).
This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc

Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New Jersey # MA011/MA012
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393

ACCREDITED IN ACCORDANCE WITH nelac

Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

*Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.*

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-32**<br>SA48441-01 | 08-204262.00 | Ground Water | 18-Jul-06 11:15 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 26-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *90.6* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *99.4* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *102* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-31**<br>SA48441-02 | 08-204262.00 | Ground Water | 18-Jul-06 11:00 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 26-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 3.3 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *93.8* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *107* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *99.0* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *102* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-30**<br>SA48441-03 | 08-204262.00 | Ground Water | 18-Jul-06 11:50 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 26-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 3.8 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *92.4* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *107* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *101* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *103* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-8**<br>SA48441-04 | 08-204262.00 | Ground Water | 18-Jul-06 12:10 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 5.0 | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 26-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 38.6 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *95.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *98.2* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *103* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-101**<br>SA48441-05 | 08-204262.00 | Ground Water | 18-Jul-06 13:10 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 26-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *93.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *101* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *105* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-29**<br>SA48441-06 | 08-204262.00 | Ground Water | 18-Jul-06 12:40 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 10.0 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *91.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *105* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *99.2* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *102* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-2**<br>SA48441-07 | 08-204262.00 | Ground Water | 18-Jul-06 13:22 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 58.4 | | µg/l | 1.0 | 1 | SW846 8260B | 28-Jul-06 | 28-Jul-06 | 6071849 | Jro |
| 100-41-4 | Ethylbenzene | 37.2 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 12.4 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | 8.4 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 40.0 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 12.0 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 63.4 | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | 2.4 | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *99.4* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *106* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *97.0* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *99.4* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW-1R**<br>SA48441-08 | 08-204262.00 | Ground Water | 18-Jul-06 14:12 | 20-Jul-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 26-Jul-06 | 27-Jul-06 | 6071640 | Jro |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *94.0* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *108* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *100* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *103* | | *70-130 %* | | | " | " | " | " | " |

# Volatile Organic Compounds - Quality Control

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6071640 - SW846 5030 Water MS** | | | | | | | | | | |
| **Blank (6071640-BLK1)** | | | | | | | | | | |
| Prepared & Analyzed: 26-Jul-06 | | | | | | | | | | |
| Benzene | BRL | | µg/l | 1.0 | | | | | | |
| Chlorobenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,1-Dichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| Ethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| Methyl tert-butyl ether | BRL | | µg/l | 1.0 | | | | | | |
| Naphthalene | BRL | | µg/l | 1.0 | | | | | | |
| Toluene | BRL | | µg/l | 1.0 | | | | | | |
| Trichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| m,p-Xylene | BRL | | µg/l | 2.0 | | | | | | |
| o-Xylene | BRL | | µg/l | 1.0 | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *47.8* | | µg/l | | *50.0* | | *95.6* | *70-130* | | |
| *Surrogate: Toluene-d8* | *52.6* | | µg/l | | *50.0* | | *105* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *52.5* | | µg/l | | *50.0* | | *105* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *53.0* | | µg/l | | *50.0* | | *106* | *70-130* | | |
| **LCS (6071640-BS1)** | | | | | | | | | | |
| Prepared & Analyzed: 26-Jul-06 | | | | | | | | | | |
| Benzene | 19.8 | | µg/l | | 20.0 | | 99.0 | 70-130 | | 30 |
| Ethylbenzene | 20.0 | | µg/l | | 20.0 | | 100 | 70-130 | | 30 |
| Methyl tert-butyl ether | 22.6 | | µg/l | | 20.0 | | 113 | 70-130 | | 30 |
| Naphthalene | 21.7 | | µg/l | | 20.0 | | 108 | 70-130 | | 30 |
| Toluene | 20.2 | | µg/l | | 20.0 | | 101 | 70-130 | | 30 |
| 1,2,4-Trimethylbenzene | 21.6 | | µg/l | | 20.0 | | 108 | 70-130 | | 30 |
| 1,3,5-Trimethylbenzene | 20.7 | | µg/l | | 20.0 | | 104 | 70-130 | | 30 |
| m,p-Xylene | 42.2 | | µg/l | | 40.0 | | 106 | 70-130 | | 30 |
| o-Xylene | 20.6 | | µg/l | | 20.0 | | 103 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *50.8* | | µg/l | | *50.0* | | *102* | *70-130* | | |
| *Surrogate: Toluene-d8* | *52.0* | | µg/l | | *50.0* | | *104* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *47.1* | | µg/l | | *50.0* | | *94.2* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *49.4* | | µg/l | | *50.0* | | *98.8* | *70-130* | | |
| **LCS Dup (6071640-BSD1)** | | | | | | | | | | |
| Prepared & Analyzed: 26-Jul-06 | | | | | | | | | | |
| Benzene | 18.8 | | µg/l | | 20.0 | | 94.0 | 70-130 | 5.18 | 30 |
| Ethylbenzene | 19.2 | | µg/l | | 20.0 | | 96.0 | 70-130 | 4.08 | 30 |
| Methyl tert-butyl ether | 21.9 | | µg/l | | 20.0 | | 110 | 70-130 | 2.69 | 30 |
| Naphthalene | 20.8 | | µg/l | | 20.0 | | 104 | 70-130 | 3.77 | 30 |
| Toluene | 19.2 | | µg/l | | 20.0 | | 96.0 | 70-130 | 5.08 | 30 |
| 1,2,4-Trimethylbenzene | 21.3 | | µg/l | | 20.0 | | 106 | 70-130 | 1.87 | 30 |
| 1,3,5-Trimethylbenzene | 20.5 | | µg/l | | 20.0 | | 102 | 70-130 | 1.94 | 30 |
| m,p-Xylene | 40.8 | | µg/l | | 40.0 | | 102 | 70-130 | 3.85 | 30 |
| o-Xylene | 20.3 | | µg/l | | 20.0 | | 102 | 70-130 | 0.976 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *51.7* | | µg/l | | *50.0* | | *103* | *70-130* | | |
| *Surrogate: Toluene-d8* | *51.9* | | µg/l | | *50.0* | | *104* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *49.0* | | µg/l | | *50.0* | | *98.0* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *49.6* | | µg/l | | *50.0* | | *99.2* | *70-130* | | |
| **Matrix Spike (6071640-MS1)** **Source: SA48434-01** | | | | | | | | | | |
| Prepared & Analyzed: 26-Jul-06 | | | | | | | | | | |
| Benzene | 17.0 | | µg/l | | 20.0 | BRL | 85.0 | 70-130 | | 30 |
| Chlorobenzene | 17.7 | | µg/l | | 20.0 | BRL | 88.5 | 70-130 | | 30 |
| 1,1-Dichloroethene | 19.7 | | µg/l | | 20.0 | BRL | 98.5 | 70-130 | | 30 |
| Toluene | 18.0 | | µg/l | | 20.0 | BRL | 90.0 | 70-130 | | 30 |
| Trichloroethene | 17.8 | | µg/l | | 20.0 | BRL | 89.0 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *45.5* | | µg/l | | *50.0* | | *91.0* | *70-130* | | |

# Volatile Organic Compounds - Quality Control

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6071640 - SW846 5030 Water MS** | | | | | | | | | | |
| **Matrix Spike (6071640-MS1)** | **Source: SA48434-01** | | | | | | | | | |
| Prepared & Analyzed: 26-Jul-06 | | | | | | | | | | |
| *Surrogate: Toluene-d8* | *53.0* | | µg/l | | *50.0* | | *106* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *49.1* | | µg/l | | *50.0* | | *98.2* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *51.2* | | µg/l | | *50.0* | | *102* | *70-130* | | |
| **Matrix Spike Dup (6071640-MSD1)** | **Source: SA48434-01** | | | | | | | | | |
| Prepared & Analyzed: 26-Jul-06 | | | | | | | | | | |
| Benzene | 17.8 | | µg/l | | 20.0 | BRL | 89.0 | 70-130 | 4.60 | 30 |
| Chlorobenzene | 18.7 | | µg/l | | 20.0 | BRL | 93.5 | 70-130 | 5.49 | 30 |
| 1,1-Dichloroethene | 19.1 | | µg/l | | 20.0 | BRL | 95.5 | 70-130 | 3.09 | 30 |
| Toluene | 19.0 | | µg/l | | 20.0 | BRL | 95.0 | 70-130 | 5.41 | 30 |
| Trichloroethene | 18.7 | | µg/l | | 20.0 | BRL | 93.5 | 70-130 | 4.93 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *46.3* | | µg/l | | *50.0* | | *92.6* | *70-130* | | |
| *Surrogate: Toluene-d8* | *53.2* | | µg/l | | *50.0* | | *106* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *50.4* | | µg/l | | *50.0* | | *101* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *50.4* | | µg/l | | *50.0* | | *101* | *70-130* | | |
| **Batch 6071849 - SW846 5030 Water MS** | | | | | | | | | | |
| **Blank (6071849-BLK1)** | | | | | | | | | | |
| Prepared & Analyzed: 28-Jul-06 | | | | | | | | | | |
| Benzene | BRL | | µg/l | 1.0 | | | | | | |
| Chlorobenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,1-Dichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| Ethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| Methyl tert-butyl ether | BRL | | µg/l | 1.0 | | | | | | |
| Naphthalene | BRL | | µg/l | 1.0 | | | | | | |
| Toluene | BRL | | µg/l | 1.0 | | | | | | |
| Trichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| m,p-Xylene | BRL | | µg/l | 2.0 | | | | | | |
| o-Xylene | BRL | | µg/l | 1.0 | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *47.4* | | µg/l | | *50.0* | | *94.8* | *70-130* | | |
| *Surrogate: Toluene-d8* | *53.2* | | µg/l | | *50.0* | | *106* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *52.5* | | µg/l | | *50.0* | | *105* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *52.6* | | µg/l | | *50.0* | | *105* | *70-130* | | |
| **LCS (6071849-BS1)** | | | | | | | | | | |
| Prepared & Analyzed: 28-Jul-06 | | | | | | | | | | |
| Benzene | 20.1 | | µg/l | | 20.0 | | 100 | 70-130 | | 30 |
| Ethylbenzene | 21.4 | | µg/l | | 20.0 | | 107 | 70-130 | | 30 |
| Methyl tert-butyl ether | 22.2 | | µg/l | | 20.0 | | 111 | 70-130 | | 30 |
| Naphthalene | 20.9 | | µg/l | | 20.0 | | 104 | 70-130 | | 30 |
| Toluene | 21.1 | | µg/l | | 20.0 | | 106 | 70-130 | | 30 |
| 1,2,4-Trimethylbenzene | 23.1 | | µg/l | | 20.0 | | 116 | 70-130 | | 30 |
| 1,3,5-Trimethylbenzene | 22.4 | | µg/l | | 20.0 | | 112 | 70-130 | | 30 |
| m,p-Xylene | 44.8 | | µg/l | | 40.0 | | 112 | 70-130 | | 30 |
| o-Xylene | 22.0 | | µg/l | | 20.0 | | 110 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *53.2* | | µg/l | | *50.0* | | *106* | *70-130* | | |
| *Surrogate: Toluene-d8* | *51.6* | | µg/l | | *50.0* | | *103* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *47.6* | | µg/l | | *50.0* | | *95.2* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *48.9* | | µg/l | | *50.0* | | *97.8* | *70-130* | | |
| **LCS Dup (6071849-BSD1)** | | | | | | | | | | |
| Prepared & Analyzed: 28-Jul-06 | | | | | | | | | | |
| Benzene | 19.2 | | µg/l | | 20.0 | | 96.0 | 70-130 | 4.08 | 30 |
| Ethylbenzene | 19.5 | | µg/l | | 20.0 | | 97.5 | 70-130 | 9.29 | 30 |
| Methyl tert-butyl ether | 22.0 | | µg/l | | 20.0 | | 110 | 70-130 | 0.905 | 30 |

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6071849 - SW846 5030 Water MS** | | | | | | | | | | |
| **LCS Dup (6071849-BSD1)** | | | | | | | | | | |
| Prepared & Analyzed: 28-Jul-06 | | | | | | | | | | |
| Naphthalene | 20.2 | | µg/l | | 20.0 | | 101 | 70-130 | 2.93 | 30 |
| Toluene | 19.4 | | µg/l | | 20.0 | | 97.0 | 70-130 | 8.87 | 30 |
| 1,2,4-Trimethylbenzene | 20.8 | | µg/l | | 20.0 | | 104 | 70-130 | 10.9 | 30 |
| 1,3,5-Trimethylbenzene | 20.1 | | µg/l | | 20.0 | | 100 | 70-130 | 11.3 | 30 |
| m,p-Xylene | 40.5 | | µg/l | | 40.0 | | 101 | 70-130 | 10.3 | 30 |
| o-Xylene | 20.3 | | µg/l | | 20.0 | | 102 | 70-130 | 7.55 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *51.9* | | µg/l | | *50.0* | | *104* | *70-130* | | |
| *Surrogate: Toluene-d8* | *50.9* | | µg/l | | *50.0* | | *102* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *47.9* | | µg/l | | *50.0* | | *95.8* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *49.6* | | µg/l | | *50.0* | | *99.2* | *70-130* | | |
| **Matrix Spike (6071849-MS1)** | **Source: SA48441-07** | | | | | | | | | |
| Prepared & Analyzed: 28-Jul-06 | | | | | | | | | | |
| Benzene | 74.9 | | µg/l | | 20.0 | 58.4 | 82.5 | 70-130 | | 30 |
| Chlorobenzene | 19.0 | | µg/l | | 20.0 | BRL | 95.0 | 70-130 | | 30 |
| 1,1-Dichloroethene | 18.0 | | µg/l | | 20.0 | BRL | 90.0 | 70-130 | | 30 |
| Toluene | 27.3 | | µg/l | | 20.0 | 8.45 | 94.2 | 70-130 | | 30 |
| Trichloroethene | 18.5 | | µg/l | | 20.0 | BRL | 92.5 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *51.0* | | µg/l | | *50.0* | | *102* | *70-130* | | |
| *Surrogate: Toluene-d8* | *53.3* | | µg/l | | *50.0* | | *107* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *47.7* | | µg/l | | *50.0* | | *95.4* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *48.8* | | µg/l | | *50.0* | | *97.6* | *70-130* | | |
| **Matrix Spike Dup (6071849-MSD1)** | **Source: SA48441-07** | | | | | | | | | |
| Prepared & Analyzed: 28-Jul-06 | | | | | | | | | | |
| Benzene | 69.2 | QM-07 | µg/l | | 20.0 | 58.4 | 54.0 | 70-130 | 41.8 | 30 |
| Chlorobenzene | 18.6 | | µg/l | | 20.0 | BRL | 93.0 | 70-130 | 2.13 | 30 |
| 1,1-Dichloroethene | 17.8 | | µg/l | | 20.0 | BRL | 89.0 | 70-130 | 1.12 | 30 |
| Toluene | 26.6 | | µg/l | | 20.0 | 8.45 | 90.8 | 70-130 | 3.68 | 30 |
| Trichloroethene | 18.1 | | µg/l | | 20.0 | BRL | 90.5 | 70-130 | 2.19 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *50.3* | | µg/l | | *50.0* | | *101* | *70-130* | | |
| *Surrogate: Toluene-d8* | *53.9* | | µg/l | | *50.0* | | *108* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *48.1* | | µg/l | | *50.0* | | *96.2* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *48.8* | | µg/l | | *50.0* | | *97.6* | *70-130* | | |

## Notes and Definitions

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

SA48441-MF

SPECTRUM ANALYTICAL, INC.
*Featuring*
HANIBAL TECHNOLOGY

# CHAIN OF CUSTODY RECORD

Page 1 of 1

**Special Handling:**
- ☒ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS
65 Millet St Suite 301
Richmond, VT 05477

Project Mgr.: Laura Woodard

Invoice To: NWH00 10434 (QP)

P.O. No.: _____ RQN: _____

Project No.: 08-204262.00
Site Name: Northern Petroleum
Location: St. Johnsbury State: VT
Sampler(s): JG / KR

1=$Na_2S2O_3$ 2=HCl 3=$H_2SO_4$ 4=$HNO_3$ 5=NaOH 6=Ascorbic Acid
7=$CH_3OH$ 8= $NaHSO_4$ 9=_____ 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

| Lab Id: | Sample Id: | Date: | Time: | Type | Matrix | Preservative | Containers: # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic | Analyses: 8021B MTBE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48441-01 | MW-32 | 7/18/06 | 11:15 | G | GW | 2 | 3 | | | | ✓ | | | | | | | |
| -02 | MW-31 | | 11:00 | | | | | | | | | | | | | | | |
| -03 | MW-30 | | 11:50 | | | | | | | | | | | | | | | |
| -04 | MW-8 | | 12:10 | | | | | | | | | | | | | | | |
| -05 | MW-101 | | 13:10 | | | | | | | | | | | | | | | |
| -06 | MW-29 | | 12:40 | | | | | | | | | | | | | | | |
| -07 | MW-2 | | 13:22 | | | | | | | | | | | | | | | |
| -08 | MW-1R | | 14:12 | ↓ | ↓ | ↓ | ↓ | | | | ↓ | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

QA Reporting Notes: (check if needed)

State specific reporting standards
*If applicable, please list below.*

☐ Provide MCP CAM Report
Were all field QC requirements met as per MADEP CAM Section 2.0?
☐ Yes ☐ No
*(Response required for CAM report)*

☐ Fax results when available to (____) _____
☒ E-mail to LWoodard@ECSConsult.com
EDD Format _____
Condition upon receipt: ☒ Iced ☐ Ambient ☐ °C 3

| Relinquished by: | Received by: | Date: | Time: |
|---|---|---|---|
| | | 7/18/06 | 16:00 |
| FedX | | 7/20/06 | 1016 |
| | | | |

Report Date:
14-Aug-06 17:03

☑ Final Report
☐ Re-Issued Report
☐ Revised Report

SPECTRUM ANALYTICAL, INC.
*Featuring*
HANIBAL TECHNOLOGY

# *Laboratory Report*

Environmental Compliance Services
65 Millet Street; Suite 301
Richmond, VT 05477
Attn: Laura Woodard

Project: Northern Petroleum-St Johnsbury, VT
Project 08-204262

| Laboratory ID | Client Sample ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SA49007-01 | Trip Blank | Ground Water | 31-Jul-06 08:45 | 02-Aug-06 10:25 |
| SA49007-02 | MW 17 | Ground Water | 31-Jul-06 13:40 | 02-Aug-06 10:25 |
| SA49007-03 | MW 18 | Ground Water | 31-Jul-06 15:05 | 02-Aug-06 10:25 |

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met
Please note that this report contains 8 pages of analytical data plus Chain of Custody document(s).


Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New Jersey # MA011/MA012
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393

Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

*Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.*

RECEIVED
AUG 2 1 2006

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **Trip Blank**<br>SA49007-01 | 08-204262 | Ground Water | 31-Jul-06 08:45 | 02-Aug-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | BRL | | µg/l | 1.0 | 1 | SW846 8260B | 08-Aug-06 | 09-Aug-06 | 6080562 | mar |
| 100-41-4 | Ethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 91-20-3 | Naphthalene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-88-3 | Toluene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | BRL | | µg/l | 2.0 | 1 | " | " | " | " | " |
| 95-47-6 | o-Xylene | BRL | | µg/l | 1.0 | 1 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *92.6* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *98.6* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *115* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *101* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW 17**<br>SA49007-02 | 08-204262 | Ground Water | 31-Jul-06 13:40 | 02-Aug-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 1,450 | | µg/l | 5.0 | 5 | SW846 8260B | 08-Aug-06 | 09-Aug-06 | 6080562 | mar |
| 100-41-4 | Ethylbenzene | 549 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 14.0 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 364 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-88-3 | Toluene | 1,570 | E | µg/l | 5.0 | 5 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 819 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 242 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 2,380 | E | µg/l | 10.0 | 5 | " | " | " | " | " |
| 95-47-6 | o-Xylene | 632 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *94.4* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *102* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *114* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *99.6* | | *70-130 %* | | | " | " | " | " | " |
| Volatile Organic Compounds by 8260B | | | | | | | | | **SA49007-02RE1** | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 108-88-3 | Toluene | 2,110 | | µg/l | 25.0 | 25 | SW846 8260B | 10-Aug-06 | 10-Aug-06 | 6080689 | RLJ |
| 1330-20-7 | m,p-Xylene | 3,220 | | µg/l | 50.0 | 25 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *103* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *89.7* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *91.0* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *92.3* | | *70-130 %* | | | " | " | " | " | " |

| Sample Identification | Client Project # | Matrix | Collection Date/Time | Received |
|---|---|---|---|---|
| **MW 18**<br>SA49007-03 | 08-204262 | Ground Water | 31-Jul-06 15:05 | 02-Aug-06 |

| CAS No. | Analyte(s) | Result | Flag | Units | *RDL | Dilution | Method Ref. | Prepared | Analyzed | Batch | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | | | | | | | |
| Volatile Organic Compounds by 8260B | | | | | | | | | | | |
| Prepared by method SW846 5030 Water MS | | | | | | | | | | | |
| 71-43-2 | Benzene | 728 | | µg/l | 5.0 | 5 | SW846 8260B | 08-Aug-06 | 09-Aug-06 | 6080562 | mar |
| 100-41-4 | Ethylbenzene | 150 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1634-04-4 | Methyl tert-butyl ether | 108 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 91-20-3 | Naphthalene | 87.8 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-88-3 | Toluene | 125 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 95-63-6 | 1,2,4-Trimethylbenzene | 277 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 108-67-8 | 1,3,5-Trimethylbenzene | 70.6 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| 1330-20-7 | m,p-Xylene | 678 | | µg/l | 10.0 | 5 | " | " | " | " | " |
| 95-47-6 | o-Xylene | 90.8 | | µg/l | 5.0 | 5 | " | " | " | " | " |
| *Surrogate recoveries:* | | | | | | | | | | | |
| *460-00-4* | *4-Bromofluorobenzene* | *94.8* | | *70-130 %* | | | " | " | " | " | " |
| *2037-26-5* | *Toluene-d8* | *100* | | *70-130 %* | | | " | " | " | " | " |
| *17060-07-0* | *1,2-Dichloroethane-d4* | *114* | | *70-130 %* | | | " | " | " | " | " |
| *1868-53-7* | *Dibromofluoromethane* | *99.2* | | *70-130 %* | | | " | " | " | " | " |

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6080562 - SW846 5030 Water MS** | | | | | | | | | | |
| **Blank (6080562-BLK1)** | | | | | | | | | | |
| Prepared & Analyzed: 08-Aug-06 | | | | | | | | | | |
| Benzene | BRL | | µg/l | 1.0 | | | | | | |
| Chlorobenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,1-Dichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| Ethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| Methyl tert-butyl ether | BRL | | µg/l | 1.0 | | | | | | |
| Naphthalene | BRL | | µg/l | 1.0 | | | | | | |
| Toluene | BRL | | µg/l | 1.0 | | | | | | |
| Trichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| m,p-Xylene | BRL | | µg/l | 2.0 | | | | | | |
| o-Xylene | BRL | | µg/l | 1.0 | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *48.7* | | µg/l | | *50.0* | | *97.4* | *70-130* | | |
| *Surrogate: Toluene-d8* | *50.1* | | µg/l | | *50.0* | | *100* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *61.0* | | µg/l | | *50.0* | | *122* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *51.0* | | µg/l | | *50.0* | | *102* | *70-130* | | |
| **LCS (6080562-BS1)** | | | | | | | | | | |
| Prepared: 08-Aug-06 Analyzed: 09-Aug-06 | | | | | | | | | | |
| Benzene | 17.4 | | µg/l | | 20.0 | | 87.0 | 70-130 | | 30 |
| Ethylbenzene | 18.9 | | µg/l | | 20.0 | | 94.5 | 70-130 | | 30 |
| Methyl tert-butyl ether | 18.6 | | µg/l | | 20.0 | | 93.0 | 70-130 | | 30 |
| Naphthalene | 19.7 | | µg/l | | 20.0 | | 98.5 | 70-130 | | 30 |
| Toluene | 16.0 | | µg/l | | 20.0 | | 80.0 | 70-130 | | 30 |
| 1,2,4-Trimethylbenzene | 20.6 | | µg/l | | 20.0 | | 103 | 70-130 | | 30 |
| 1,3,5-Trimethylbenzene | 20.2 | | µg/l | | 20.0 | | 101 | 70-130 | | 30 |
| m,p-Xylene | 37.5 | | µg/l | | 40.0 | | 93.8 | 70-130 | | 30 |
| o-Xylene | 19.4 | | µg/l | | 20.0 | | 97.0 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *47.5* | | µg/l | | *50.0* | | *95.0* | *70-130* | | |
| *Surrogate: Toluene-d8* | *50.6* | | µg/l | | *50.0* | | *101* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *60.8* | | µg/l | | *50.0* | | *122* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *51.5* | | µg/l | | *50.0* | | *103* | *70-130* | | |
| **Matrix Spike (6080562-MS1)** **Source: SA48997-06** | | | | | | | | | | |
| Prepared: 08-Aug-06 Analyzed: 09-Aug-06 | | | | | | | | | | |
| Benzene | 17.5 | | µg/l | | 20.0 | 0.550 | 84.8 | 70-130 | | 30 |
| Chlorobenzene | 20.6 | | µg/l | | 20.0 | BRL | 103 | 70-130 | | 30 |
| 1,1-Dichloroethene | 20.6 | | µg/l | | 20.0 | BRL | 103 | 70-130 | | 30 |
| Toluene | 16.3 | | µg/l | | 20.0 | BRL | 81.5 | 70-130 | | 30 |
| Trichloroethene | 19.1 | | µg/l | | 20.0 | BRL | 95.5 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *49.5* | | µg/l | | *50.0* | | *99.0* | *70-130* | | |
| *Surrogate: Toluene-d8* | *51.6* | | µg/l | | *50.0* | | *103* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *59.4* | | µg/l | | *50.0* | | *119* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *50.5* | | µg/l | | *50.0* | | *101* | *70-130* | | |
| **Matrix Spike Dup (6080562-MSD1)** **Source: SA48997-06** | | | | | | | | | | |
| Prepared: 08-Aug-06 Analyzed: 09-Aug-06 | | | | | | | | | | |
| Benzene | 17.4 | | µg/l | | 20.0 | 0.550 | 84.2 | 70-130 | 0.710 | 30 |
| Chlorobenzene | 20.6 | | µg/l | | 20.0 | BRL | 103 | 70-130 | 0.00 | 30 |
| 1,1-Dichloroethene | 19.8 | | µg/l | | 20.0 | BRL | 99.0 | 70-130 | 3.96 | 30 |
| Toluene | 16.1 | | µg/l | | 20.0 | BRL | 80.5 | 70-130 | 1.23 | 30 |
| Trichloroethene | 18.3 | | µg/l | | 20.0 | BRL | 91.5 | 70-130 | 4.28 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *49.0* | | µg/l | | *50.0* | | *98.0* | *70-130* | | |
| *Surrogate: Toluene-d8* | *51.5* | | µg/l | | *50.0* | | *103* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *60.2* | | µg/l | | *50.0* | | *120* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *51.6* | | µg/l | | *50.0* | | *103* | *70-130* | | |
| **Batch 6080689 - SW846 5030 Water MS** | | | | | | | | | | |

## Volatile Organic Compounds - Quality Control

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6080689 - SW846 5030 Water MS** | | | | | | | | | | |
| **Blank (6080689-BLK1)** | | | | | | | | | | |
| Prepared & Analyzed: 10-Aug-06 | | | | | | | | | | |
| Benzene | BRL | | µg/l | 1.0 | | | | | | |
| Chlorobenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,1-Dichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| Ethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| Methyl tert-butyl ether | BRL | | µg/l | 1.0 | | | | | | |
| Naphthalene | BRL | | µg/l | 1.0 | | | | | | |
| Toluene | BRL | | µg/l | 1.0 | | | | | | |
| Trichloroethene | BRL | | µg/l | 1.0 | | | | | | |
| 1,2,4-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| 1,3,5-Trimethylbenzene | BRL | | µg/l | 1.0 | | | | | | |
| m,p-Xylene | BRL | | µg/l | 2.0 | | | | | | |
| o-Xylene | BRL | | µg/l | 1.0 | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *30.6* | | µg/l | | *30.0* | | *102* | *70-130* | | |
| *Surrogate: Toluene-d8* | *25.8* | | µg/l | | *30.0* | | *86.0* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *26.5* | | µg/l | | *30.0* | | *88.3* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *27.1* | | µg/l | | *30.0* | | *90.3* | *70-130* | | |
| **LCS (6080689-BS1)** | | | | | | | | | | |
| Prepared & Analyzed: 10-Aug-06 | | | | | | | | | | |
| Benzene | 20.6 | | µg/l | | 20.0 | | 103 | 70-130 | | 30 |
| Ethylbenzene | 21.0 | | µg/l | | 20.0 | | 105 | 70-130 | | 30 |
| Methyl tert-butyl ether | 18.4 | | µg/l | | 20.0 | | 92.0 | 70-130 | | 30 |
| Naphthalene | 21.6 | | µg/l | | 20.0 | | 108 | 70-130 | | 30 |
| Toluene | 18.8 | | µg/l | | 20.0 | | 94.0 | 70-130 | | 30 |
| 1,2,4-Trimethylbenzene | 21.9 | | µg/l | | 20.0 | | 110 | 70-130 | | 30 |
| 1,3,5-Trimethylbenzene | 21.9 | | µg/l | | 20.0 | | 110 | 70-130 | | 30 |
| m,p-Xylene | 43.3 | | µg/l | | 40.0 | | 108 | 70-130 | | 30 |
| o-Xylene | 21.8 | | µg/l | | 20.0 | | 109 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *30.4* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| *Surrogate: Toluene-d8* | *27.6* | | µg/l | | *30.0* | | *92.0* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *27.8* | | µg/l | | *30.0* | | *92.7* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *29.0* | | µg/l | | *30.0* | | *96.7* | *70-130* | | |
| **LCS Dup (6080689-BSD1)** | | | | | | | | | | |
| Prepared & Analyzed: 10-Aug-06 | | | | | | | | | | |
| Benzene | 20.8 | | µg/l | | 20.0 | | 104 | 70-130 | 0.966 | 30 |
| Ethylbenzene | 20.5 | | µg/l | | 20.0 | | 102 | 70-130 | 2.90 | 30 |
| Methyl tert-butyl ether | 17.4 | | µg/l | | 20.0 | | 87.0 | 70-130 | 5.59 | 30 |
| Naphthalene | 20.2 | | µg/l | | 20.0 | | 101 | 70-130 | 6.70 | 30 |
| Toluene | 17.6 | | µg/l | | 20.0 | | 88.0 | 70-130 | 6.59 | 30 |
| 1,2,4-Trimethylbenzene | 20.9 | | µg/l | | 20.0 | | 104 | 70-130 | 5.61 | 30 |
| 1,3,5-Trimethylbenzene | 21.0 | | µg/l | | 20.0 | | 105 | 70-130 | 4.65 | 30 |
| m,p-Xylene | 41.8 | | µg/l | | 40.0 | | 104 | 70-130 | 3.77 | 30 |
| o-Xylene | 21.4 | | µg/l | | 20.0 | | 107 | 70-130 | 1.85 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *30.4* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| *Surrogate: Toluene-d8* | *26.9* | | µg/l | | *30.0* | | *89.7* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *26.6* | | µg/l | | *30.0* | | *88.7* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *28.4* | | µg/l | | *30.0* | | *94.7* | *70-130* | | |
| **Matrix Spike (6080689-MS1)** | **Source: SA48987-07** | | | | | | | | | |
| Prepared & Analyzed: 10-Aug-06 | | | | | | | | | | |
| Benzene | 19.6 | | µg/l | | 20.0 | BRL | 98.0 | 70-130 | | 30 |
| Chlorobenzene | 19.2 | | µg/l | | 20.0 | BRL | 96.0 | 70-130 | | 30 |
| 1,1-Dichloroethene | 15.8 | | µg/l | | 20.0 | BRL | 79.0 | 70-130 | | 30 |
| Toluene | 16.9 | | µg/l | | 20.0 | BRL | 84.5 | 70-130 | | 30 |
| Trichloroethene | 17.8 | | µg/l | | 20.0 | BRL | 89.0 | 70-130 | | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *31.8* | | µg/l | | *30.0* | | *106* | *70-130* | | |
| *Surrogate: Toluene-d8* | *27.3* | | µg/l | | *30.0* | | *91.0* | *70-130* | | |

***This laboratory report is not valid without an authorized signature on the cover page.***

* Reportable Detection Limit  BRL = Below Reporting Limit

| Analyte(s) | Result | Flag | Units | *RDL | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6080689 - SW846 5030 Water MS** | | | | | | | | | | |
| **Matrix Spike (6080689-MS1)** | **Source: SA48987-07** | | | | | | | | | |
| Prepared & Analyzed: 10-Aug-06 | | | | | | | | | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *27.4* | | µg/l | | *30.0* | | *91.3* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *27.9* | | µg/l | | *30.0* | | *93.0* | *70-130* | | |
| **Matrix Spike Dup (6080689-MSD1)** | **Source: SA48987-07** | | | | | | | | | |
| Prepared & Analyzed: 10-Aug-06 | | | | | | | | | | |
| Benzene | 20.1 | | µg/l | | 20.0 | BRL | 100 | 70-130 | 2.02 | 30 |
| Chlorobenzene | 20.3 | | µg/l | | 20.0 | BRL | 102 | 70-130 | 6.06 | 30 |
| 1,1-Dichloroethene | 16.5 | | µg/l | | 20.0 | BRL | 82.5 | 70-130 | 4.33 | 30 |
| Toluene | 17.8 | | µg/l | | 20.0 | BRL | 89.0 | 70-130 | 5.19 | 30 |
| Trichloroethene | 18.1 | | µg/l | | 20.0 | BRL | 90.5 | 70-130 | 1.67 | 30 |
| *Surrogate: 4-Bromofluorobenzene* | *30.3* | | µg/l | | *30.0* | | *101* | *70-130* | | |
| *Surrogate: Toluene-d8* | *27.2* | | µg/l | | *30.0* | | *90.7* | *70-130* | | |
| *Surrogate: 1,2-Dichloroethane-d4* | *27.4* | | µg/l | | *30.0* | | *91.3* | *70-130* | | |
| *Surrogate: Dibromofluoromethane* | *27.9* | | µg/l | | *30.0* | | *93.0* | *70-130* | | |

## Notes and Definitions

__RE Reanalysis for data confirmation

E The concentration indicated for this analyte is an estimated value above the calibration range of the instrument This value is considered an estimate (CLP E-flag).

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

SA4 9057 ✓

SPECTRUM ANALYTICAL, INC.
*Featuring*
HANIBAL TECHNOLOGY

# CHAIN OF CUSTODY RECORD

Page 1 of 1

**Special Handling:**
- ☒ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS
65 Millet St. Suite 301
Richmond, VT 05477

Project Mgr.: Laura Woodard

Invoice To: Will call 8/2/06 (PM)

P.O. No.: _____ RQN: _____

Project No.: 08-204262
Site Name: Northern Petroleum
Location: St. Johnsbury State: VT
Sampler(s): J.G.

1=$Na_2S_2O_3$ 2=HCl 3=$H_2SO_4$ 4=$HNO_3$ 5=NaOH 6=Ascorbic Acid
7=$CH_3OH$ 8=$NaHSO_4$ 9=_____ 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

| Lab Id: | Sample Id: | Date: | Time: | Type | Matrix | Preservative | Containers: # of VOA Vials | # of Amber Glass | # of Clear Glass | # of Plastic | Analyses: 8260 8021B-VT scan | QA Reporting Notes: (check if needed) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SA 49057-01 | Trip Blank | 7/31/06 | 8:45 | G | GW | 2 | 3 | | | | ✓ | |
| -02 | MW 17 | ↓ | 13:40 | ↓ | ↓ | ↓ | ↓ | | | | ↓ | |
| -03 | MW 18 | ↓ | 15:05 | ↓ | ↓ | ↓ | ↓ | | | | ↓ | |

QA Reporting Notes (check if needed):
- ☐ Provide MA DEP MCP CAM Report
- ☐ Provide CT DPH RCP Report

**QA/QC Reporting Level**
☐ Standard ☐ No QC
☐ Other _____

State specific reporting standards: ~~per attached~~ email

☐ Fax results when available to (____) _____
☒ E-mail to Lwoodard@ecsconsult.com
EDD Format _____
Condition upon receipt: ☒ Iced ☐ Ambient ☒ °C 2

| Relinquished by: | Received by: | Date: | Time: |
|---|---|---|---|
| [signature] | Fed Ex | 7/31/06 | 18:45 |
| Fed Ex | [signature] | 8/2/06 | 1025 |

# APPENDIX B

FIELD NOTES

7/17/06 Northern Petroleum St Johnsbury
08-20426200

10:30 Onsite JE/KR

10:45 Calibrate Horiba

| pH | cond. | Turb | D.O. |
|---|---|---|---|
| 3.96 | 6.43 | 114 | 8.45 |

11:21 Calibrate Pine Horiba

| PH | Cond | Turb | DO |
|---|---|---|---|
| 4.00 | 4.50 | 0.0 | 8.13 |

- Could not find MW-1, MW-11, MW-12, MW-17, MW-18
- Found FP in MW-22 and MW-28
- 500mL taken from MW-22
- 200mL taken from MW-28

# Bail Down Test

## -MW-22

Before Bailing Measurements:

DTP = 4.43' DTW = 5.79' Thickness = 1.36'

Recharge Test: Began @ 14:32

| Time | DTP | DTW | FP Thickness |
|---|---|---|---|
| 0 | 4.66 | 4.76 | 0.10 |
| 2 | 4.65 | 4.82 | 0.17 |
| 4 | 4.65 | 4.81 | 0.16 |
| 6 | 4.65 | 4.82 | 0.17 |
| 8 | 4.65 | 4.81 | 0.16 |
| 10 | 4.66 | 4.81 | 0.16 |
| 12 | 4.65 | 4.81 | 0.16 |
| 14 | 4.66 | 4.81 | 0.15 |
| 16 | 4.66 | 4.81 | 0.15 |
| 18 | 4.66 | 4.81 | 0.15 |
| 20 | 4.66 | 4.80 | 0.14 |
| 30 | 4.65 | 4.80 | 0.15 |

Bailed Approx 500 mL FP, unable to get down to 0.01'



## MW-28

Note: Cap missing

Before Bailing measurements:

DTP = 6.92' DTW = 7.56' Thickness = 0.64'

Recharge test: Began @ 17:37

| Time | DTP | DTW | FP Thickness |
|---|---|---|---|
| 0 | 6.99 | 7.09 | 0.10 |
| 2 | 6.98 | 7.09 | 0.11 |
| 4 | 6.98 | 7.10 | 0.12 |
| 6 | 6.97 | 7.11 | 0.14 |
| 8 | 6.97 | 7.12 | 0.15 |
| 10 | 6.97 | 7.13 | 0.16 |
| 12 | 6.97 | 7.13 | 0.16 |
| 14 | 6.97 | 7.13 | 0.16 |
| 16 | 6.97 | 7.13 | 0.16 |
| 18 | 6.97 | 7.13 | 0.16 |
| 20 | 6.97 | 7.13 | 0.16 |
| 30 | 6.96 | 7.13 | 0.17 |

Bailed Approximately 260 mL FP. Unable to bail down to 0.01'

KR/SG offsite 18:30

7/18/06 . Northern Petroleum, St. J, VT.
08-20426200

10:00Am Onsite KR/JG

- Complete well monitoring

10:15 Calibrate Horiba (ECS)

| PH | Cond | Turb | DO |
|---|---|---|---|
| 3.99 | 4.28 | 17.4 | 7.72 |

Calibrate Pine Horiba

| PH | Cond | Turb | DO |
|---|---|---|---|
| 3.86 | 4.47 | 209 | 7.60 |

[illegible]

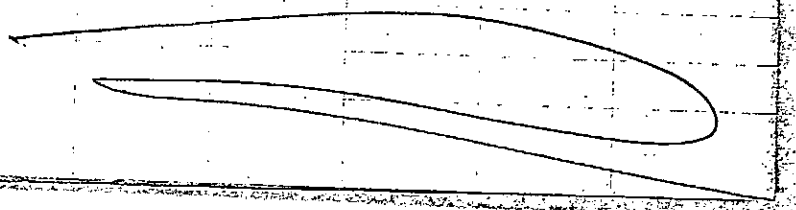
MW-7

~40 ml. removed

| Time | DTP | DTW |
|---|---|---|
| Initial | 5.62 | 5.75 |
| 0 | 5.65 | 5.74 |
| 2 | 5.64 | 5.74 |
| 4 | 5.63 | 5.71 |
| 6 | 5.64 | 5.74 |
| 8 | 5.64 | 5.77 |
| 10 | 5.64 | 5.76 |
| 12 | 5.64 | 5.74 |
| 14 | 5.64 | 5.74 |
| 16 | 5.64 | 5.77 |
| 18 | 5.64 | 5.77 |
| 20 | 5.63 | 5.77 |
| 30 | 5.64 | 5.67 |

-Still could not locate missing wells from yesterday

KR/SG Offsite 14:30



## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N Petroleum ~~[redacted]~~ St. Johnsbury Date: 7/17/06

Sample I.D.: MW 5 Collection Time 11:45

Sampling Sequence: 1 Of 18

EC S Field Staff Collecting This Sample: J.C.

Climatic Conditions (Temp/Precip): 90°F

Depth To Product: N.D. Feet Depth To Water: 4.20 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: NA IP

Total Depth Of Boring (Take Measurement After Sampling): 10.84

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b Mscan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: odor, Sheen on purge

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW5
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.84 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 7.50'
Pumping Device: Geopump Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed RPM | Cumulative Volume Purged 5.46' | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:15 | 4.20 | 60 | 60 | 0.10 | 16.44 | 1.49 | 5.28 | -57 | 3.65 | -5 | odor |
| 11:20 | 4.20 | | | | 15.21 | 1.50 | 5.52 | -66 | 2.27 | ~5 | |
| 11:25 | 4.20 | | | | 15.34 | 1.49 | 5.61 | -67 | 2.00 | ~5 | |
| 11:30 | 4.20 | | | | 15.42 | 1.49 | 5.72 | -73 | 1.74 | ~5 | |
| 11:35 | 4.20 | | | | 15.42 | 1.49 | 5.85 | -101 | 1.62 | 755 | |
| 11:40 | 4.20 | | | | 15.61 | 1.48 | 5.93 | -110 | 1.53 | 708 | |
| 11:45 | 4.20 | | | 2.0 | 15.55 | 1.48 | 5.96 | -111 | 1.56 | 715 | Sample taken |
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Notes:
ODOR, sheen on purge

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW-13 Collection Time ~~11:57~~ 12:05

Sampling Sequence: 2 of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P.C.

Depth To Product: ND Feet Depth To Water: 6.06 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): *0.0 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.74

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: ~~Hz~~ odor

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***--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--***

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-13
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top N/A Bottom 10.74 Of Screen (Below RP)
Pump Intake Depth: 7.25
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:45 | 10.16 | 120 | 120 | | 13.8 | 1.51 | 7.15 | -115 | 12.66 | 219.0 | |
| 11:50 | 10.17 | ↓ | ↓ | | 13.3 | 1.44 | 7.30 | -124 | 7.43 | 191.0 | |
| 11:55 | " | | | | 13.3 | 1.42 | 7.43 | -130 | 5.15 | 57.0 | |
| 12:00 | " | | | ↓ | 13.3 | 1.41 | 7.51 | -133 | 4.02 | 41.2 | |
| 12:05 | " | ↓ | ↓ | 2.5 gal | " | 1.41 | 7.55 | -136 | 3.42 | 36.6 | Smoke |
| | | | | | | | | | | | |
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Notes:
odor

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum St. Johnsbury Date: 7/17/06

Sample I.D.: MW16 Collection Time 12:45

Sampling Sequence: 3 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 90° F

Depth To Product: ND Feet Depth To Water: 4.55 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): ~0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 10.95'

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy V Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VT Scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Odor and Sheen on purge

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: W. Petroleum
Well Id: MW16
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA
Depth To Bottom: 10.95
Of Screen (Below RP)
Pump Intake Depth: 8.0
Pumping Device: Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Sc4 | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:25 | 4.55 | 70 | 70 | 0.10 | 15.62 | 2.50 | 6.19 | -127 | 5.60 | -5 | |
| 12:30 | 4.55 | | | | 15.19 | 2.11 | 6.25 | -130 | 2.48 | 505 | |
| 12:35 | 4.55 | | | | 14.96 | 2.00 | 6.29 | -129 | 2.13 | 235 | |
| 12:40 | 4.55 | | | | 15.10 | 1.97 | 6.31 | -129 | 2.00 | 162 | |
| 12:45 | 4.55 | | | 2.00 | 14.92 | 1.96 | 6.34 | -129 | 1.79 | 102 | sampled |
| | | | | | | | | | | | DUP taken |

Notes:
Odor and sheen on purge

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 6/17/06

Sample I.D.: MW-22 Collection Time N/A

Sampling Sequence: 4 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P.C.

Depth To Product: 4.43 Feet Depth To Water: 5.79 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.1 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: Detected IP

Total Depth Of Boring (Take Measurement After Sampling): N/A

Well Yield: High _____ Low _____ Pumped Dry? N/A

Final Water Appearance (At Sample Collection) Clear _____ Cloudy _____ Opaque _____ N/A

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Bail Down Test preformed

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum

Well Id: MW-22

Field Personnel: KR

Reference Point (RP – TOC or other-describe): TOC

Depth To ~ / ~ Of Screen (Below RP)

Top Bottom

Pump Intake Depth: ~

Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
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Notes:

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N Pittsfield St. Johnsbury Date: 7/17/06

Sample I.D.: MW1 Collection Time 14:55

Sampling Sequence: 5 Of 18

EC S Field Staff Collecting This Sample: J.G.

Climatic Conditions (Temp/Precip): 100° F

Depth To Product: ND Feet Depth To Water: 4.80 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 11.30

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VT Scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: light odor

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW 1
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA
Depth To Bottom: 11.30
Of Screen (Below RP)
Pump Intake Depth: 7.50'
Pumping Device: Peristaltic geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14:25 | 4.80 | 80 | 80 | 0.10 | 15.08 | 4.19 | 6.08 | -128 | 9.70 | -5 | |
| 14:30 | 4.80 | | | | 14.43 | 2.95 | 6.29 | -127 | 3.28 | 473 | |
| 14:35 | 4.80 | | | | 14.28 | 2.68 | 6.35 | -125 | 2.50 | 284 | |
| 14:40 | 4.80 | | | | 14.11 | 2.64 | 6.35 | -122 | 2.13 | 154 | |
| 14:45 | 4.80 | | | | 13.92 | 2.56 | 6.36 | -120 | 2.11 | 122 | |
| 14:50 | 4.80 | | | | 13.95 | 2.55 | 6.35 | -116 | 2.01 | 111 | |
| 14:55 | 4.80 | | | 2.5 | 13.98 | 2.55 | 6.36 | -115 | 1.99 | 119 | Sampled |
| | | | | | | | | | | | |
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Notes:
light odor

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW-19 Collection Time 15:50

Sampling Sequence: 6 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P. C.

Depth To Product: ND Feet Depth To Water: 4.68 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.1 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.26

Well Yield: High_____ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Ø odor and Sheen

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-19
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA / Bottom: 11.26 Of Screen (Below RP)
Pump Intake Depth: 8.25
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15:20 | 4.85 | 120 | 120 | | 17.5 | 3.06 | 7.29 | -136 | 7.06 | 492.0 | |
| 15:25 | " | 120 | 120 | | 16.9 | 2.34 | 7.31 | -145 | 2.52 | 248.0 | |
| 15:30 | " | " | " | | 16.3 | 2.22 | 7.39 | -150 | 1.94 | 143.0 | |
| 15:35 | " | ↓ | ↓ | | 16.5 | 2.23 | 7.40 | -152 | 1.70 | 200.0 | |
| 15:40 | " | | | ↓ | 17.0 | 2.15 | 7.42 | -155 | 1.48 | 255.0 | |
| 15:45 | " | ↓ | ↓ | 2 gal | 16.6 | 2.13 | 7.44 | -157 | 1.29 | 267.0 | |
| | | | | | | | | | | | |
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Notes:
Odor and Sheen

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum St. Johnsbury Date: 7/17/06

Sample I.D.: MW-2ECS Collection Time 16:05

Sampling Sequence: 7 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 100°F

Depth To Product: ND Feet Depth To Water: 5.48 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 10.82

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque V

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021B VT scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: light odor

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-2ECS
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.82 Of Screen (Below RP)
Top / Bottom
Pump Intake Depth: 7.5'
Pumping Device: Peristaltic Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15:30 | 5.48 | 60 | 60 | 0.10 | 17.27 | 3.79 | 6.11 | -119 | 4.70 | -5 | |
| 15:35 | 5.50 | | | | 16.25 | 2.76 | 623 | -126 | 2.27 | -5 | |
| 15:40 | 5.50 | | | | 16.02 | 2.49 | 6.29 | -128 | 2.07 | -5 | |
| 15:45 | 5.51 | | | | 16.00 | 2.44 | 631 | -127 | 2.03 | 784 | |
| 15:50 | 5.51 | | | | 16.10 | 2.39 | 6.32 | -127 | 2.03 | 522 | |
| 15:55 | 5.51 | | | | 15.76 | 2.36 | 633 | -125 | 2.09 | 582 | |
| 16:00 | 5.51 | | | | 15.81 | 2.32 | 6.32 | -124 | 2.10 | 442 | |
| 16:05 | 5.51 | ↓ | ↓ | ↓ | 15.66 | 2.29 | 6.30 | -121 | 2.03 | 391 | Sample taken |
| | | | | | | | | | | | |
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Notes:
light odor

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW-27 Collection Time 17:25

Sampling Sequence: 6 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P.C.

Depth To Product: ND Feet Depth To Water: 7.39 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): +3.0 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.81

Well Yield: High ✓ Low Pumped Dry?

Final Water Appearance (At Sample Collection) Clear Cloudy ✓ Opaque

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021 B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: other

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-27
Field Personnel: NR
Reference Point (RP – TOC or other-describe): TOC

Depth To Screen (Below RP): N/A (Top) / 11.80' (Bottom)
Pump Intake Depth: 9.5'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~1~~ 16:45 | ~~7.88~~ 7.88 | 60 | 60 | | 17.8 | .414 | 7.48 | 30 | 4.04 | 771.0 | |
| 16:50 | 7.93 | | | | 17.3 | 0.381 | 7.24 | 43 | 2.82 | 481 | |
| 16:55 | " | | | | 17.2 | 0.379 | 7.26 | 45 | 2.57 | 405.0 | |
| 17:00 | 7.94 | | | | 16.9 | 0.375 | 7.31 | 54 | 1.96 | 698.0 | |
| 17:05 | 7.96 | | | | 16.5 | 0.374 | 7.36 | 60 | 1.81 | -5.0 | |
| 17:10 | 7.95 | | | | 16.3 | 0.372 | 7.38 | 69 | 1.56 | " | |
| 17:15 | 7.96 | | | | 16.0 | 0.368 | 7.40 | 78 | 1.38 | " | |
| 17:20 | 7.96 | | | 2gal | 16.3 | .368 | 7.40 | 73 | 1.28 | " | |
| | | | | | | | | | | | |
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Notes:
Odor

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW 26 Collection Time 17:15

Sampling Sequence: 9 Of 18

EC S Field Staff Collecting This Sample: J.G

Climatic Conditions (Temp/Precip): 97°F

Depth To Product: ND Feet Depth To Water: 7.62 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): +3.00 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 13.26

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy ✓ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VTsan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-26
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA
Depth To Bottom: 13.28
Of Screen (Below RP)
Pump Intake Depth: 10'
Pumping Device: Peristaltic Grapemp

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16:45 | 7.63 | 60 | 60 | 0.10 | 19.48 | 0.27 | 6.52 | -34 | 3.73 | 5 | |
| 16:50 | 7.63 | | | | 19.45 | 0.27 | 6.38 | -33 | 2.63 | -5 | |
| 16:55 | 7.63 | | | | 19.34 | 0.26 | 6.42 | -38 | 1.73 | -5 | |
| 17:00 | 7.65 | | | | 19.08 | 0.26 | 6.46 | -40 | 1.60 | 268 | Turbidity going between (-5) and higher #s |
| 17:05 | 7.66 | | | | 19.09 | 0.27 | 6.48 | -41 | 1.45 | 846 | Jumped back down to -5 |
| 17:10 | 7.67 | | | | 18.58 | 0.27 | 6.50 | -40 | 1.41 | 957 | Then back to -5 |
| 17:15 | 7.66 | | | 1.75 | 18.91 | 0.27 | 6.51 | -40 | 1.35 | 84 | Then back to -5 sampled |
| | | | | | | | | | | | |
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Notes:
None

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW 102 Collection Time 18:20

Sampling Sequence: 10 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 95°F

Depth To Product: ND Feet Depth To Water: 4.20 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.18 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 9.26

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy ✓ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8026 VT Scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW 102
Field Personnel: J.G.
Reference Point (RP – TOC or other-describe): TOC

Depth To ~ / 12.26 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 8.00'
Pumping Device: Peristaltic Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17:50 | 4.20 | 80 | 80 | 0.10 | 16.04 | 0.76 | 6.71 | -103 | 3.20 | 512 | |
| 17:55 | 4.20 | | | | 15.32 | 0.81 | 6.72 | -121 | 1.81 | 239 | |
| 18:00 | 4.20 | | | | 14.92 | 0.85 | 6.68 | -128 | 1.48 | 173 | |
| 18:05 | 4.21 | | | | 14.69 | 0.88 | 6.58 | -127 | 1.37 | 172 | |
| 18:10 | 4.21 | | | | 14.64 | 0.89 | 6.62 | -131 | 1.29 | 140 | |
| 18:15 | 4.21 | | | | 14.60 | 0.90 | 6.65 | -134 | 1.26 | 148 | |
| 18:20 | 4.23 | | | 2.00 | 14.61 | 0.90 | 6.67 | -136 | 1.22 | 156 | Samples taken |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW32 Collection Time 11:15

Sampling Sequence: 11 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 90°, P.C.

Depth To Product: ND Feet Depth To Water: 4.66 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.20 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: /IP

Total Depth Of Boring (Take Measurement After Sampling): 10.60

Well Yield: High ✓ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear _____ Cloudy ✓ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-32
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.60 Of Screen (Below RP)
Top / Bottom
Pump Intake Depth: 7.5'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10:30 | 4.66 | 60 | 60 | 0.10 | 21.24 | 0.96 | 6.18 | 108 | 6.32 | 920 | |
| 10:35 | 4.66 | | | | 20.72 | 0.99 | 6.28 | 106 | 5.91 | 845 | |
| 10:40 | 4.66 | | | | 20.53 | 1.01 | 6.43 | 97 | 5.14 | 455 | |
| 10:45 | 4.66 | | | | 20.40 | 0.99 | 6.47 | 87 | 4.74 | 320 | |
| 10:50 | 4.66 | | | | 20.61 | 0.99 | 6.51 | 78 | 4.98 | 255 | |
| 10:55 | 4.66 | | | | 20.70 | 0.97 | 6.55 | 70 | 4.69 | 197 | |
| 11:00 | 4.67 | | | | 20.18 | 0.99 | 6.53 | 69 | 4.67 | 191 | |
| 11:05 | 4.67 | | | | 20.13 | 0.98 | 6.59 | 62 | 4.45 | 187 | |
| 11:10 | 4.67 | | | | 20.08 | 0.99 | 6.62 | 57 | 4.36 | 184 | |
| 11:15 | 4.67 | | | 1.75 | 19.91 | 0.98 | 6.64 | 55 | 4.25 | 182 | Sample Taken |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-31 Collection Time 11:00

Sampling Sequence: 12 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 85°, P.C.

Depth To Product: ND Feet Depth To Water: 4.42 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.2 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.71

Well Yield: High ____ Low ✓ Pumped Dry? ____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy ____ Opaque ____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

Last Update: Sep 2005

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-31
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: N/A
Depth To Bottom: 10.71
Of Screen (Below RP)
Pump Intake Depth: 7.75
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10:32 | 5.42 | 60 | 60 | | 18.4 | .789 | 7.25 | 19 | 7.36 | 71.5 | |
| 10:37 | 5.37 | 90 | 90 | | 17.6 | .837 | 7.57 | -90 | 2.61 | 60.1 | |
| 10:42 | 5.38 | " | " | | 17.0 | .911 | 7.69 | -98 | 1.78 | 47.7 | |
| 10:47 | " | ↓ | ↓ | | 17.3 | .876 | 7.75 | -102 | 1.62 | 36.6 | |
| 10:52 | 5.39 | | | ↓ | 17.2 | .833 | 7.75 | -107 | 1.52 | 26.2 | |
| 10:57 | " | ↓ | ↓ | 2gal | 17.2 | .824 | 7.80 | -114 | 1.35 | | |
| | | | | | | | | | | | |
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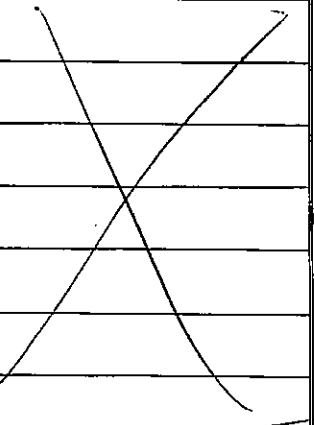

Notes:
None

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-30 Collection Time 11:50

Sampling Sequence: 13 of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 90°, P.C.

Depth To Product: ND Feet Depth To Water: 5.01 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.2 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.60

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*–USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS–*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-30
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Screen (Below RP): Top N/A Bottom 10.60
Pump Intake Depth: 7.75
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:15 | 5.18 | 60 | 60 | | 18.9 | .536 | 7.93 | 4 | 9.02 | 125.0 | |
| 11:20 | 5.16 | 60 | 60 | | 17.9 | .512 | 7.77 | -21 | 4.03 | 38.2 | |
| 11:25 | " | " | " | | 17.6 | .641 | 7.76 | -37 | 2.85 | 25.1 | |
| 11:30 | " | " | " | | 17.7 | .671 | 7.80 | -45 | 2.45 | 26.1 | |
| 11:35 | " | " | " | | 17.4 | .691 | 7.79 | -52 | 2.02 | 23.1 | |
| 11:40 | 5.17 | ↓ | ↓ | ↓ | 17.3 | .706 | 7.79 | -60 | 1.69 | 17.5 | |
| 11:45 | 5.17 | | ↓ | 2gal | 17.3 | .720 | 7.79 | -62 | 1.55 | 10.1 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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Notes:
None

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW8 Collection Time 12:10

Sampling Sequence: 14 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 85°F

Depth To Product: ND Feet Depth To Water: 5.86 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): +3.00 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 14.66

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW8
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 14.66 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 10'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:35 | 5.86 | 60 | 60 | 0.10 | 20.36 | 1.27 | 6.48 | -98 | 4.64 | 271 | |
| 11:40 | 5.86 | | | | 17.14 | 1.30 | 6.48 | -81 | 3.19 | 133 | |
| 11:45 | 5.86 | | | | 17.10 | 1.30 | 6.49 | -103 | 2.65 | 116 | |
| 11:50 | 5.86 | | | | 17.02 | 1.29 | 6.51 | -113 | 2.06 | 109 | |
| 11:55 | 5.86 | | | | 17.15 | 1.29 | 6.51 | -117 | 1.82 | 146 | |
| 12:00 | 5.86 | | | | 16.68 | 1.29 | 6.50 | -118 | 1.79 | 157 | |
| 12:05 | 5.86 | | | | 16.67 | 1.29 | 6.52 | -121 | 1.69 | 120 | |
| 12:10 | 5.86 | | | 1.75 | 16.50 | 1.29 | 6.52 | -122 | 1.65 | 108 | Sample taken |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-29 Collection Time 12:40

Sampling Sequence: 15 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 80°, P. C.

Depth To Product: ND Feet Depth To Water: 4.78 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.3 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.00

Well Yield: High____ Low ✓ Pumped Dry? ____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy____ Opaque____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-29
Field Personnel: KK
Reference Point (RP – TOC or other-describe): TOC

Depth To Screen (Below RP): N/A (Top) / 11.00 (Bottom)
Pump Intake Depth: 7.75
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | 4.76 | 120 | 120 | | 20.4 | .500 | 7.91 | -24 | 8.92 | 24.2 | |
| 12:05 | 4.77 | | | | 19.4 | .521 | 7.66 | 3 | 2.60 | 12.9 | |
| 12:10 | " | | | | 19.3 | .584 | 7.64 | -2 | 1.49 | 4.0 | |
| 12:15 | " | | | | 18.7 | .622 | 7.63 | -15 | 1.18 | 1.8 | |
| 12:20 | " | | | | " | .638 | " | -19 | 1.11 | 2.3 | |
| 12:25 | " | | | | " | .664 | " | -27 | .98 | 4.0 | |
| 12:30 | 4.78 | | | | 18.8 | .670 | " | -31 | .80 | 3.4 | |
| 12:35 | " | | | 2.5 gal | 18.9 | .694 | " | -34 | .74 | 4.6 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-101 Collection Time 13:10

Sampling Sequence: 16 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 85°F Short Rain Event

Depth To Product: ND Feet Depth To Water: 4.81 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.88

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-101
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.88 Of Screen (Below RP)
Top ' Bottom
Pump Intake Depth: 7.5'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Liters | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:35 | 4.81 | 60 | 60 | 0.10 | 17.82 | 1.01 | 6.53 | -2 | 5.71 | 298 | |
| 12:40 | 4.82 | | | | 17.18 | 1.04 | 6.48 | -7 | 3.00 | 273 | |
| 12:45 | 4.82 | | | | 16.61 | 1.13 | 6.43 | -29 | 2.34 | 266 | |
| 12:50 | 4.82 | | | | 16.55 | 1.19 | 6.45 | -46 | 2.04 | 276 | |
| 12:55 | 4.82 | | | | 16.25 | 1.20 | 6.46 | -53 | 1.85 | 406 | |
| 13:00 | 4.82 | | | | 16.38 | 1.23 | 6.47 | -56 | 1.75 | 300 | |
| 13:05 | 4.82 | | | | 15.99 | 1.22 | 6.48 | -56 | 1.69 | 242 | |
| 13:10 | 4.81 | | | 1.80 | 16.09 | 1.23 | 6.49 | -58 | 6.66 | 178 | Sample taken |
| | | | | | | | | | | | |
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Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-2 Collection Time 13:22

Sampling Sequence: 17 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 70°, P.C.

Depth To Product: N/D Feet Depth To Water: 4.80 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.1 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.04

Well Yield: High_____ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy_____ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: odor

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-2
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: N/A
Depth To Bottom: 11.04
Of Screen (Below RP)
Pump Intake Depth: 8.0'
Pumping Device: GeoPump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:55 | 4.84 | 120 | 120 | | 16.5 | 1.32 | 7.92 | 61 | 6.61 | 32.6 | |
| 13:00 | 5.05 | | | | 16.9 | 1.23 | 7.77 | -8 | 1.31 | 31.4 | |
| 13:05 | 5.02 | | | | 16.1 | 1.10 | 7.76 | -77 | 0.80 | 22.4 | |
| 13:10 | 5.01 | | | | 16.1 | 1.09 | 7.76 | -98 | 0.53 | 9.0 | |
| 13:15 | " | | | | 16.0 | 1.13 | " | -100 | .53 | 8.1 | |
| 13:20 | " | | | 2gal | " | 1.19 | 7.74 | " | .40 | 5.9 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
~~Black~~ odor

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-1R Collection Time 14:12

Sampling Sequence: 16 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 80°, P.C.

Depth To Product: ND Feet Depth To Water: 4.85 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): 0 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 12.24

Well Yield: High_____ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy ✓ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Slight odor, no cap

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-1R
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To N/A / 12.24' Of Screen (Below RP)
Top 8.5' Bottom
Pump Intake Depth:
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13:35 | 5.18 | 90 | 90 | | 17.4 | ~~1.43~~ | 7.57 | 22 | 7.24 | 134.0 | |
| 13:40 | 5.33 | 60 | 60 | | 17.1 | 1.37 | 7.44 | 26 | 1.68 | 90.7 | |
| 13:45 | 5.20 | | | | 17.8 | 1.31 | 7.48 | 35 | 1.05 | 67.4 | |
| 13:50 | 5.21 | | | | 17.5 | 1.28 | 7.50 | 45 | ~~.90~~ | 152.0 | |
| 13:55 | " | | | | 17.6 | 1.24 | 7.54 | 54 | .90 | 131.0 | |
| 14:00 | 5.21 | | | | 17.4 | 1.24 | 7.55 | 62 | 0.98 | 108.0 | |
| 14:05 | " | | | | 17.3 | 1.25 | 7.55 | 66 | 0.96 | 98.8 | |
| 14:10 | " | ↓ | ↓ | | 17.2 | 1.24 | 7.56 | 69 | 0.95 | 88.0 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
No Cap, Slight odor

Last Update: Sep 2005

7/24/06 Northern Petroleum

08-204262 70°F

10:00 onsite JG

Bail Down Test

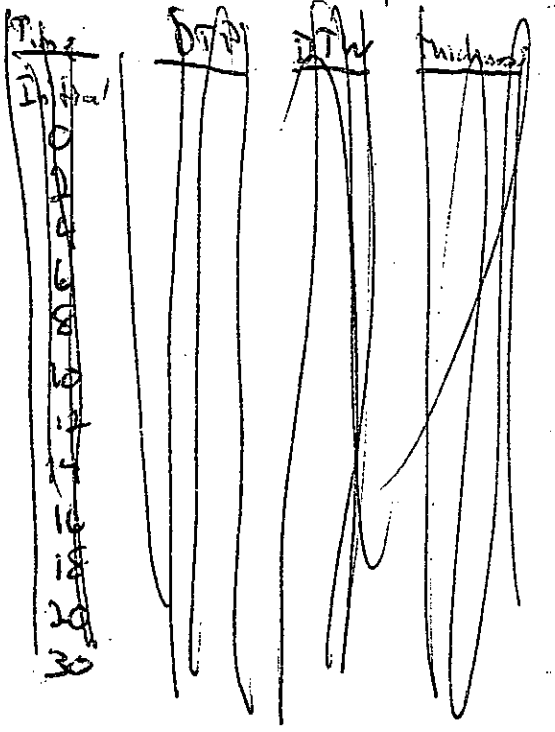
~ 20 ml Product removed

MW-22

| Time | | DTP | DTW | Thickness |
|---|---|---|---|---|
| Initial | | 4.76 | 4.99 | 0.23 |
| 10:44 | 0 | 4.79 | 4.81 | 0.02 |
| 10:46 | 2 | 4.79 | 4.82 | 0.03 |
| | 4 | 4.79 | 4.85 | 0.06 |
| 10:50 | 6 | 4.79 | 4.85 | 0.06 |
| | 8 | 4.79 | 4.84 | 0.05 |
| | 10 | 4.79 | 4.84 | 0.05 |
| | 12 | 4.80 | 4.84 | 0.04 |
| | 14 | 4.80 | 4.84 | 0.04 |
| 11:00 | 16 | 4.79 | 4.84 | 0.05 |
| | 18 | 4.79 | 4.84 | 0.05 |
| | 20 | 4.79 | 4.84 | 0.05 |
| 11:14 | 30 | 4.79 | 4.84 | 0.05 |

MW-19 - No Detect with IP
MW-17 - No Detect with IP

* MW-28 Bail Down Test — ND with IP




- above ground casing with no cap

* MW-28 - No Detect with IP.
- There was an odor but no product was on end of probe
(apparent)



MW-7 Bail Down Test ~ 15 ml. Product removed

| Time | | DTP | DTW | Thickness |
|---|---|---|---|---|
| Initial | | 5.68 | 5.81 | 0.13 |
| 11:48 | 0 | 5.70 | 5.73 | 0.03 |
| 11:50 | 2 | 5.69 | 5.74 | 0.05 |
| | 4 | 5.70 | 5.75 | 0.05 |
| | 6 | 5.69 | 5.75 | 0.06 |
| | 8 | 5.69 | 5.75 | 0.06 |
| | 10 | 5.69 | 5.76 | 0.07 |
| 12:00 | 12 | 5.69 | 5.75 | 0.06 |
| | 14 | 5.69 | 5.75 | 0.06 |
| | 16 | 5.69 | 5.75 | 0.06 |
| | 18 | 5.69 | 5.75 | 0.06 |
| 12:08 | 20 | 5.69 | 5.76 | 0.07 |
| 12:18 | 30 | 5.69 | 5.75 | 0.06 |

12:30 offsite JG.

7/31/06 Northern Petroleum
08-20426 2 75°F

10:45 onsite J.G.
-could not locate MW4, MW11
Possibly under 2 AST's beside berm

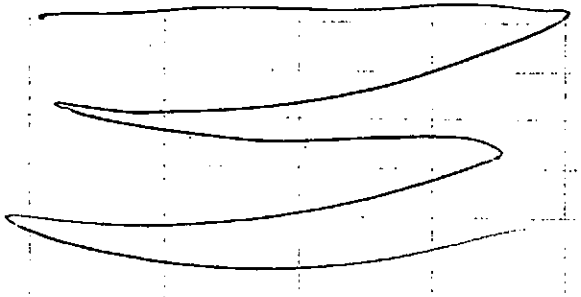
12:00 Calibrate Horiba

| pH | Cond | Turb | D.O |
|---|---|---|---|
| 3.89 | 4.44 | 0 | 7.59 |

- MW12 had free product so a bail Down test was done instead of low flow sampling.

MW19 DTW → 4.72 (WD with IP)
~~odor~~ odor from well

17:15 Offsite J.G.



Bail Down Test

MW-12 removed ~40 ml. of Product

| Time | DTP | DTW |
|---|---|---|
| Initial | 3.88 | 4.08 |
| 12:28 | 3.90 | 3.94 |
| 12:39 | 3.88 | 3.99 |
| 12:42 | 3.88 | 4.01 |
| 12:45 | 3.88 | 4.01 |
| 12:47 | 3.88 | 4.01 |
| 12:51 | 3.88 | 4.01 |
| 12:53 | 3.88 | 4.01 |
| 12:55 | 3.88 | 4.01 |
| 12:58 | 3.88 | 4.01 |
| 13:50 | 3.88 | 4.01 |

MW 22 recovered ~10 ml of Product

| Time | DTP | DTW |
|---|---|---|
| Initial 14:07 | 4.69 | 4.82 |
| 14:11 | 4.71 | 4.76 |
| 14:15 | 4.69 | 4.78 |
| 14:18 | 4.69 | 4.78 |
| 14:20 | 4.69 | 4.78 |
| 14:22 | 4.69 | 4.79 |
| 14:24 | 4.69 | 4.79 |
| 14:26 | 4.69 | 4.79 |
| 14:46 | 4.69 | 4.78 |
| 15:17 | 4.70 | 4.79 |

MW7 (~5 ml Product removed)

| Time | DTP | DTW |
|---|---|---|
| 15:35 | 5.60 | 5.63 |
| 15:46 | 5.61 | 5.62 |
| 15:49 | 5.61 | 5.63 |
| 15:51 | 5.61 | 5.63 |
| 15:54 | 5.61 | 5.63 |
| 15:56 | 5.61 | 5.63 |
| 15:59 | 5.61 | 5.64 |
| 16:01 | 5.61 | 5.63 |
| 16:03 | 5.61 | 5.63 |
| 16:05 | 5.61 | 5.63 |
| 16:42 | 5.62 | 5.64 |

MW28 (~ removed)

| Time | DTP | DTW |
|---|---|---|
| 16:10 | 6.78 | 6.94 |
| 16:18 | 6.92 | 6.93 |
| 16:20 | 6.90 | 6.91 |
| 16:22 | 6.88 | 6.90 |
| 16:25 | 6.88 | 6.96 |
| 16:27 | 6.86 | 7.00 |
| 16:29 | 6.85 | 7.02 |
| 16:31 | 6.85 | 7.02 |
| 16:33 | 6.88 | 7.03 |
| 16:35 | 6.88 | 7.04 |
| 17:11 | 6.86 | 7.09 |

Cap was off when arrived. I put it back on at end of day. This is an above ground casing so rain past few days could get in.

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/31/06

Sample I.D.: MW-17 Collection Time 13:40

Sampling Sequence: 1 Of 2

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 75° F

Depth To Product: ND Feet Depth To Water: 4.75 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 11.13

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VTsrun

Field Test Results (HACH Kits):

Alkalinity: NA Chloride: NA

Iron (II): NA Sulfate: NA

Notes:

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: ~~MW~~ MW 17
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To N/A / 11.13 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 8.00'
Pumping Device: Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13:10 | 4.75 | 200 | 200 | 0.50 | 15.00 | 2.52 | 7.19 | -132 | 11.80 | 0 | Slight odor |
| 13:15 | 4.75 | ↓ | ↓ | ↓ | 14.70 | 2.40 | 7.29 | -135 | 8.80 | 306 | Sheen on purge |
| 13:20 | 4.75 | ↓ | ↓ | ↓ | 14.4 | 2.32 | 7.39 | -137 | 6.56 | 79 | |
| 13:25 | 4.75 | ↓ | ↓ | ↓ | 14.3 | 2.26 | 7.46 | -139 | 5.50 | 38 | |
| 13:30 | 4.75 | ↓ | ↓ | ↓ | 14.3 | 2.20 | 7.56 | -142 | 4.75 | 29 | |
| 13:35 | 4.75 | ↓ | ↓ | ↓ | 14.2 | 2.19 | 7.63 | -142 | 4.55 | 35 | |
| 13:40 | 4.75 | ↓ | ↓ | 3.00 | 14.2 | 2.17 | 7.69 | -143 | 4.29 | 53 | Sampled |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
No cap on casing

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum St. Johnsbury Date: 7/31/06

Sample I.D.: MW 18 Collection Time 15:05

Sampling Sequence: 2 Of 2

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 75° F

Depth To Product: ND Feet Depth To Water: 4.73 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.15 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 10.88

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021B VTscan

Field Test Results (HACH Kits):

Alkalinity: NA Chloride: NA

Iron (II): NA Sulfate: NA

Notes:

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

# Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW 18
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA / Depth To Bottom: 10.88 Of Screen (Below RP)
Pump Intake Depth: 7.5'
Pumping Device: Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14:40 | 4.73 | 140 | 140 | 0.10 | 15.3 | 2.73 | 7.59 | -112 | 10.04 | 340 | Moderate Odor |
| 14:45 | 4.73 | ↓ | ↓ | ↓ | 15.0 | 2.67 | 7.64 | -114 | 5.97 | 79 | Sheen on Purge |
| 14:50 | 4.73 | | | | 15.1 | 2.62 | 7.68 | -116 | 4.55 | 47 | |
| 14:55 | 4.73 | | | | 15.1 | 2.59 | 7.74 | -119 | 3.85 | 33 | |
| 15:00 | 4.73 | | | ↓ | 15.0 | 2.56 | 7.80 | -122 | 3.52 | 24 | |
| 15:05 | 4.73 | ↓ | ↓ | 2.00 | 15.8 | 2.53 | 7.85 | -124 | 3.19 | 8 | Samples Taken |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
NO Cap on casing

Last Update: Sep 2005

8/7/06 W. Petroleum in St. Johnsbury

08-204262 72°F

9:30 Onsite JG.

MW7 Bail Down Testing

Removed ~ 5ml

| | Time | DTP | DTW | Casing |
|---|---|---|---|---|
| Initial | 9:33 | 5.49 | 5.50 | Clear |
| | 9:40 | ND | 5.50 | Clear |
| | 9:42 | 5.495 | 5.50 | Clear |
| | 9:44 | 5.495 | 5.50 | Clear |
| | 9:46 | 5.495 | 5.50 | Slight Sheen |
| | 9:48 | ND | 5.49 | Sheen |
| | 9:50 | ND | 5.49 | |
| | 9:52 | 5.495 | 5.50 | |
| | 9:54 | 5.495 | 5.50 | |
| | 9:56 | ND | 5.49 | |
| | 9:58 | ND | 5.49 | |
| | 10:00 | ND | 5.50 | |
| | 11:27 | ND | 5.50 | |

| | | | Time |
|---|---|---|---|
| MW17 | DTW → 4.59 | no odor | 10:10 |
| MW19 | DTW → 4.61 | no odor | 10:14 |

MW-22 Bail Down Test

| Time | DTP | DTW |
|---|---|---|
| Initial 10:16 | 4.37 | 5.82 |
| 10:22 | 4.61 | 4.69 |
| 10:24 | 4.59 | 4.73 |
| 10:26 | 4.59 | 4.74 |
| 10.28 | 4.59 | 4.75 |
| 10.30 | 4.59 | 4.76 |
| 10:32 | 4.59 | 4.76 |
| 10:34 | 4.59 | 4.76 |
| 10:36 | 4.59 | 4.76 |
| 10:38 | 4.59 | 4.76 |
| 10:40 | 4.59 | 4.76 |
| 10:42 | 4.59 | 4.76 |
| 11.32 | 4.58 | 4.74 |

Strong Odor
removed ~200 ml of Product

MW28 Bail Down Test

| Time | DTP | DTW |
|---|---|---|
| Initial 10:50 | 6.68 | 7.03 |
| 10:58 | 6.85 | 6.86 |
| 11:00 | 6.81 | 6.95 |
| 11:02 | 6.83 | 6.92 |
| 11:04 | 6.81 | 6.95 |
| 11:06 | 6.81 | 6.95 |
| 11:08 | 6.83 | 6.93 |
| 11:10 | 6.82 | 6.90 |
| 11:12 | 6.81 | 6.93 |
| 11:14 | 6.81 | 6.91 |
| 11:16 | 6.81 | 6.96 |
| 11:18 | 6.81 | 6.88 |
| 12:12 | 6.75 | 6.77 |

- Product appeared frothy/bubbly as if air was being blown into well
- Strong Odor
- removed ~30 ml of Product

12:30 offsite JG

7/17/06 Northern Petroleum St Johnsbury
08-20426200

10:30 Onsite JE/KR

10:45 Calibrate Horiba

| pH | cond. | Turb | D.O. |
|---|---|---|---|
| 3.96 | 6.43 | 114 | 8.45 |

11:21 Calibrate Pine Horiba

| PH | Cond | Turb | DO |
|---|---|---|---|
| 4.00 | 4.50 | 0.0 | 8.13 |

- Could not find MW-1, MW-11, MW-12, MW-17, MW-18
- Found FP in MW-22 and MW-28
- 500mL taken from MW-22
- 200mL taken from MW-28

# Bail Down Test

## -MW-22

Before Bailing Measurements:

DTP = 4.43' DTW = 5.79' Thickness = 1.36'

Recharge Test: Began @ 14:32

| Time | DTP | DTW | FP Thickness |
|---|---|---|---|
| 0 | 4.66 | 4.76 | 0.10 |
| 2 | 4.65 | 4.82 | 0.17 |
| 4 | 4.65 | 4.81 | 0.16 |
| 6 | 4.65 | 4.82 | 0.17 |
| 8 | 4.65 | 4.81 | 0.16 |
| 10 | 4.66 | 4.81 | 0.16 |
| 12 | 4.65 | 4.81 | 0.16 |
| 14 | 4.66 | 4.81 | 0.15 |
| 16 | 4.66 | 4.81 | 0.15 |
| 18 | 4.66 | 4.81 | 0.15 |
| 20 | 4.66 | 4.80 | 0.14 |
| 30 | 4.65 | 4.80 | 0.15 |

Bailed Approx 500 mL FP, unable to get down to 0.01'



## MW-28

Note: Cap missing

Before Bailing measurements:

DTP = 6.92' DTW = 7.56' Thickness = 0.64'

Recharge test: Began @ 17:37

| Time | DTP | DTW | FP Thickness |
|---|---|---|---|
| 0 | 6.99 | 7.09 | 0.10 |
| 2 | 6.98 | 7.09 | 0.11 |
| 4 | 6.98 | 7.10 | 0.12 |
| 6 | 6.97 | 7.11 | 0.14 |
| 8 | 6.97 | 7.12 | 0.15 |
| 10 | 6.97 | 7.13 | 0.16 |
| 12 | 6.97 | 7.13 | 0.16 |
| 14 | 6.97 | 7.13 | 0.16 |
| 16 | 6.97 | 7.13 | 0.16 |
| 18 | 6.97 | 7.13 | 0.16 |
| 20 | 6.97 | 7.13 | 0.16 |
| 30 | 6.96 | 7.13 | 0.17 |

Bailed Approximately 260 mL FP. Unable to bail down to 0.01'

KR/SG offsite 18:30

7/18/06 . Northern Petroleum, St. J, VT.
08-20426200

10:00Am Onsite KR/JG

- Complete well monitoring

10:15 Calibrate Horiba (ECS)

| PH | Cond | Turb | DO |
|---|---|---|---|
| 3.99 | 4.28 | 17.4 | 7.72 |

Calibrate Pine Horiba

| PH | Cond | Turb | DO |
|---|---|---|---|
| 3.86 | 4.47 | 209 | 7.60 |

[illegible]

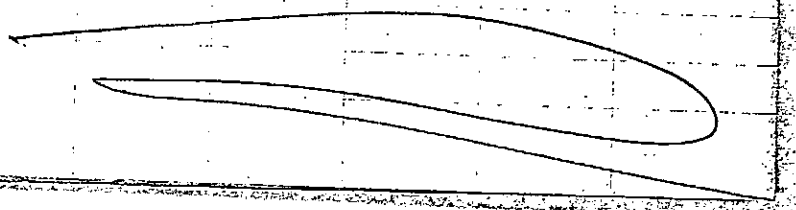
MW-7

~40 ml. removed

| Time | DTP | DTW |
|---|---|---|
| Initial | 5.62 | 5.75 |
| 0 | 5.65 | 5.74 |
| 2 | 5.64 | 5.74 |
| 4 | 5.63 | 5.71 |
| 6 | 5.64 | 5.74 |
| 8 | 5.64 | 5.77 |
| 10 | 5.64 | 5.76 |
| 12 | 5.64 | 5.74 |
| 14 | 5.64 | 5.74 |
| 16 | 5.64 | 5.77 |
| 18 | 5.64 | 5.77 |
| 20 | 5.63 | 5.77 |
| 30 | 5.64 | 5.67 |

-Still could not locate missing wells from yesterday

KR/SG Offsite 14:30



## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N Petroleum ~~[redacted]~~ St. Johnsbury Date: 7/17/06

Sample I.D.: MW 5 Collection Time 11:45

Sampling Sequence: 1 Of 18

EC S Field Staff Collecting This Sample: J.C.

Climatic Conditions (Temp/Precip): 90°F

Depth To Product: N.D. Feet Depth To Water: 4.20 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: NA IP

Total Depth Of Boring (Take Measurement After Sampling): 10.84

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b Mscan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: odor, Sheen on purge

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW5
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.84 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 7.50'
Pumping Device: Geopump Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed RPM | Cumulative Volume Purged 5.46' | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:15 | 4.20 | 60 | 60 | 0.10 | 16.44 | 1.49 | 5.28 | -57 | 3.65 | -5 | odor |
| 11:20 | 4.20 | | | | 15.21 | 1.50 | 5.52 | -66 | 2.27 | ~5 | |
| 11:25 | 4.20 | | | | 15.34 | 1.49 | 5.61 | -67 | 2.00 | ~5 | |
| 11:30 | 4.20 | | | | 15.42 | 1.49 | 5.72 | -73 | 1.74 | ~5 | |
| 11:35 | 4.20 | | | | 15.42 | 1.49 | 5.85 | -101 | 1.62 | 755 | |
| 11:40 | 4.20 | | | | 15.61 | 1.48 | 5.93 | -110 | 1.53 | 708 | |
| 11:45 | 4.20 | | | 2.0 | 15.55 | 1.48 | 5.96 | -111 | 1.56 | 715 | Sample taken |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
ODOR, sheen on purge

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW-13 Collection Time ~~11:57~~ 12:05

Sampling Sequence: 2 of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P.C.

Depth To Product: ND Feet Depth To Water: 6.06 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): *0.0 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.74

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: ~~Hz~~ odor

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***--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--***

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-13
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top N/A Bottom 10.74 Of Screen (Below RP)
Pump Intake Depth: 7.25
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:45 | 10.16 | 120 | 120 | | 13.8 | 1.51 | 7.15 | -115 | 12.66 | 219.0 | |
| 11:50 | 10.17 | ↓ | ↓ | | 13.3 | 1.44 | 7.30 | -124 | 7.43 | 191.0 | |
| 11:55 | " | | | | 13.3 | 1.42 | 7.43 | -130 | 5.15 | 57.0 | |
| 12:00 | " | | | ↓ | 13.3 | 1.41 | 7.51 | -133 | 4.02 | 41.2 | |
| 12:05 | " | ↓ | ↓ | 2.5 gal | " | 1.41 | 7.55 | -136 | 3.42 | 36.6 | Smoke |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
odor

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum St. Johnsbury Date: 7/17/06

Sample I.D.: MW16 Collection Time 12:45

Sampling Sequence: 3 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 90° F

Depth To Product: ND Feet Depth To Water: 4.55 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): ~0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 10.95'

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy V Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VT Scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Odor and Sheen on purge

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: W. Petroleum
Well Id: MW16
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA
Depth To Bottom: 10.95
Of Screen (Below RP)
Pump Intake Depth: 8.0
Pumping Device: Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Sc4 | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:25 | 4.55 | 70 | 70 | 0.10 | 15.62 | 2.50 | 6.19 | -127 | 5.60 | -5 | |
| 12:30 | 4.55 | | | | 15.19 | 2.11 | 6.25 | -130 | 2.48 | 505 | |
| 12:35 | 4.55 | | | | 14.96 | 2.00 | 6.29 | -129 | 2.13 | 235 | |
| 12:40 | 4.55 | | | | 15.10 | 1.97 | 6.31 | -129 | 2.00 | 162 | |
| 12:45 | 4.55 | | | 2.00 | 14.92 | 1.96 | 6.34 | -129 | 1.79 | 102 | sampled |
| | | | | | | | | | | | DUP taken |

Notes:
Odor and sheen on purge

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 6/17/06

Sample I.D.: MW-22 Collection Time N/A

Sampling Sequence: 4 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P.C.

Depth To Product: 4.43 Feet Depth To Water: 5.79 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.1 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: Detected IP

Total Depth Of Boring (Take Measurement After Sampling): N/A

Well Yield: High _____ Low _____ Pumped Dry? N/A

Final Water Appearance (At Sample Collection) Clear _____ Cloudy _____ Opaque _____ N/A

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Bail Down Test preformed

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum

Well Id: MW-22

Field Personnel: KR

Reference Point (RP – TOC or other-describe): TOC

Depth To ~ / ~ Of Screen (Below RP)

Top Bottom

Pump Intake Depth: ~

Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
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Notes:

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N Pittsfield St. Johnsbury Date: 7/17/06

Sample I.D.: MW1 Collection Time 14:55

Sampling Sequence: 5 Of 18

EC S Field Staff Collecting This Sample: J.G.

Climatic Conditions (Temp/Precip): 100° F

Depth To Product: ND Feet Depth To Water: 4.80 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 11.30

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VT Scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: light odor

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW 1
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA
Depth To Bottom: 11.30
Of Screen (Below RP)
Pump Intake Depth: 7.50'
Pumping Device: Peristaltic geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14:25 | 4.80 | 80 | 80 | 0.10 | 15.08 | 4.19 | 6.08 | -128 | 9.70 | -5 | |
| 14:30 | 4.80 | | | | 14.43 | 2.95 | 6.29 | -127 | 3.28 | 473 | |
| 14:35 | 4.80 | | | | 14.28 | 2.68 | 6.35 | -125 | 2.50 | 284 | |
| 14:40 | 4.80 | | | | 14.11 | 2.64 | 6.35 | -122 | 2.13 | 154 | |
| 14:45 | 4.80 | | | | 13.92 | 2.56 | 6.36 | -120 | 2.11 | 122 | |
| 14:50 | 4.80 | | | | 13.95 | 2.55 | 6.35 | -116 | 2.01 | 111 | |
| 14:55 | 4.80 | | | 2.5 | 13.98 | 2.55 | 6.36 | -115 | 1.99 | 119 | Sampled |
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Notes:
light odor

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW-19 Collection Time 15:50

Sampling Sequence: 6 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P. C.

Depth To Product: ND Feet Depth To Water: 4.68 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.1 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.26

Well Yield: High_____ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Ø odor and Sheen

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-19
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA / Bottom: 11.26 Of Screen (Below RP)
Pump Intake Depth: 8.25
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15:20 | 4.85 | 120 | 120 | | 17.5 | 3.06 | 7.29 | -136 | 7.06 | 492.0 | |
| 15:25 | " | 120 | 120 | | 16.9 | 2.34 | 7.31 | -145 | 2.52 | 248.0 | |
| 15:30 | " | " | " | | 16.3 | 2.22 | 7.39 | -150 | 1.94 | 143.0 | |
| 15:35 | " | ↓ | ↓ | | 16.5 | 2.23 | 7.40 | -152 | 1.70 | 200.0 | |
| 15:40 | " | | | ↓ | 17.0 | 2.15 | 7.42 | -155 | 1.48 | 255.0 | |
| 15:45 | " | ↓ | ↓ | 2 gal | 16.6 | 2.13 | 7.44 | -157 | 1.29 | 267.0 | |
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Notes:
Odor and Sheen

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum St. Johnsbury Date: 7/17/06

Sample I.D.: MW-2ECS Collection Time 16:05

Sampling Sequence: 7 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 100°F

Depth To Product: ND Feet Depth To Water: 5.48 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 10.82

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque V

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021B VT scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: light odor

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-2ECS
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.82 Of Screen (Below RP)
Top / Bottom
Pump Intake Depth: 7.5'
Pumping Device: Peristaltic Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15:30 | 5.48 | 60 | 60 | 0.10 | 17.27 | 3.79 | 6.11 | -119 | 4.70 | -5 | |
| 15:35 | 5.50 | | | | 16.25 | 2.76 | 623 | -126 | 2.27 | -5 | |
| 15:40 | 5.50 | | | | 16.02 | 2.49 | 6.29 | -128 | 2.07 | -5 | |
| 15:45 | 5.51 | | | | 16.00 | 2.44 | 631 | -127 | 2.03 | 784 | |
| 15:50 | 5.51 | | | | 16.10 | 2.39 | 6.32 | -127 | 2.03 | 522 | |
| 15:55 | 5.51 | | | | 15.76 | 2.36 | 633 | -125 | 2.09 | 582 | |
| 16:00 | 5.51 | | | | 15.81 | 2.32 | 6.32 | -124 | 2.10 | 442 | |
| 16:05 | 5.51 | ↓ | ↓ | ↓ | 15.66 | 2.29 | 6.30 | -121 | 2.03 | 391 | Sample taken |
| | | | | | | | | | | | |
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Notes:
light odor

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW-27 Collection Time 17:25

Sampling Sequence: 6 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 100°, P.C.

Depth To Product: ND Feet Depth To Water: 7.39 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): +3.0 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.81

Well Yield: High ✓ Low Pumped Dry?

Final Water Appearance (At Sample Collection) Clear Cloudy ✓ Opaque

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021 B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: other

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-27
Field Personnel: NR
Reference Point (RP – TOC or other-describe): TOC

Depth To Screen (Below RP): N/A (Top) / 11.80' (Bottom)
Pump Intake Depth: 9.5'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~1~~ 16:45 | ~~7.88~~ 7.88 | 60 | 60 | | 17.8 | .414 | 7.48 | 30 | 4.04 | 771.0 | |
| 16:50 | 7.93 | | | | 17.3 | 0.381 | 7.24 | 43 | 2.82 | 481 | |
| 16:55 | " | | | | 17.2 | 0.379 | 7.26 | 45 | 2.57 | 405.0 | |
| 17:00 | 7.94 | | | | 16.9 | 0.375 | 7.31 | 54 | 1.96 | 698.0 | |
| 17:05 | 7.96 | | | | 16.5 | 0.374 | 7.36 | 60 | 1.81 | -5.0 | |
| 17:10 | 7.95 | | | | 16.3 | 0.372 | 7.38 | 69 | 1.56 | " | |
| 17:15 | 7.96 | | | | 16.0 | 0.368 | 7.40 | 78 | 1.38 | " | |
| 17:20 | 7.96 | | | 2gal | 16.3 | .368 | 7.40 | 73 | 1.28 | " | |
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Notes:
Odor

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW 26 Collection Time 17:15

Sampling Sequence: 9 Of 18

EC S Field Staff Collecting This Sample: J.G

Climatic Conditions (Temp/Precip): 97°F

Depth To Product: ND Feet Depth To Water: 7.62 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): +3.00 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 13.26

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy ✓ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VTsan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-26
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA
Depth To Bottom: 13.28
Of Screen (Below RP)
Pump Intake Depth: 10'
Pumping Device: Peristaltic Grapemp

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16:45 | 7.63 | 60 | 60 | 0.10 | 19.48 | 0.27 | 6.52 | -34 | 3.73 | 5 | |
| 16:50 | 7.63 | | | | 19.45 | 0.27 | 6.38 | -33 | 2.63 | -5 | |
| 16:55 | 7.63 | | | | 19.34 | 0.26 | 6.42 | -38 | 1.73 | -5 | |
| 17:00 | 7.65 | | | | 19.08 | 0.26 | 6.46 | -40 | 1.60 | 268 | Turbidity going between (-5) and higher #s |
| 17:05 | 7.66 | | | | 19.09 | 0.27 | 6.48 | -41 | 1.45 | 846 | Jumped back down to -5 |
| 17:10 | 7.67 | | | | 18.58 | 0.27 | 6.50 | -40 | 1.41 | 957 | Then back to -5 |
| 17:15 | 7.66 | | | 1.75 | 18.91 | 0.27 | 6.51 | -40 | 1.35 | 84 | Then back to -5 sampled |
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Notes:
None

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/17/06

Sample I.D.: MW 102 Collection Time 18:20

Sampling Sequence: 10 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 95°F

Depth To Product: ND Feet Depth To Water: 4.20 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.18 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 9.26

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy ✓ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8026 VT Scan

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW 102
Field Personnel: J.G.
Reference Point (RP – TOC or other-describe): TOC

Depth To ~ / 12.26 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 8.00'
Pumping Device: Peristaltic Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17:50 | 4.20 | 80 | 80 | 0.10 | 16.04 | 0.76 | 6.71 | -103 | 3.20 | 512 | |
| 17:55 | 4.20 | | | | 15.32 | 0.81 | 6.72 | -121 | 1.81 | 239 | |
| 18:00 | 4.20 | | | | 14.92 | 0.85 | 6.68 | -128 | 1.48 | 173 | |
| 18:05 | 4.21 | | | | 14.69 | 0.88 | 6.58 | -127 | 1.37 | 172 | |
| 18:10 | 4.21 | | | | 14.64 | 0.89 | 6.62 | -131 | 1.29 | 140 | |
| 18:15 | 4.21 | | | | 14.60 | 0.90 | 6.65 | -134 | 1.26 | 148 | |
| 18:20 | 4.23 | | | 2.00 | 14.61 | 0.90 | 6.67 | -136 | 1.22 | 156 | Samples taken |
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Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW32 Collection Time 11:15

Sampling Sequence: 11 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 90°, P.C.

Depth To Product: ND Feet Depth To Water: 4.66 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.20 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: /IP

Total Depth Of Boring (Take Measurement After Sampling): 10.60

Well Yield: High ✓ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear _____ Cloudy ✓ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-32
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.60 Of Screen (Below RP)
Top / Bottom
Pump Intake Depth: 7.5'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10:30 | 4.66 | 60 | 60 | 0.10 | 21.24 | 0.96 | 6.18 | 108 | 6.32 | 920 | |
| 10:35 | 4.66 | | | | 20.72 | 0.99 | 6.28 | 106 | 5.91 | 845 | |
| 10:40 | 4.66 | | | | 20.53 | 1.01 | 6.43 | 97 | 5.14 | 455 | |
| 10:45 | 4.66 | | | | 20.40 | 0.99 | 6.47 | 87 | 4.74 | 320 | |
| 10:50 | 4.66 | | | | 20.61 | 0.99 | 6.51 | 78 | 4.98 | 255 | |
| 10:55 | 4.66 | | | | 20.70 | 0.97 | 6.55 | 70 | 4.69 | 197 | |
| 11:00 | 4.67 | | | | 20.18 | 0.99 | 6.53 | 69 | 4.67 | 191 | |
| 11:05 | 4.67 | | | | 20.13 | 0.98 | 6.59 | 62 | 4.45 | 187 | |
| 11:10 | 4.67 | | | | 20.08 | 0.99 | 6.62 | 57 | 4.36 | 184 | |
| 11:15 | 4.67 | | | 1.75 | 19.91 | 0.98 | 6.64 | 55 | 4.25 | 182 | Sample Taken |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-31 Collection Time 11:00

Sampling Sequence: 12 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 85°, P.C.

Depth To Product: ND Feet Depth To Water: 4.42 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.2 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.71

Well Yield: High ____ Low ✓ Pumped Dry? ____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy ____ Opaque ____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

Last Update: Sep 2005

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-31
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: N/A
Depth To Bottom: 10.71
Of Screen (Below RP)
Pump Intake Depth: 7.75
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10:32 | 5.42 | 60 | 60 | | 18.4 | .789 | 7.25 | 19 | 7.36 | 71.5 | |
| 10:37 | 5.37 | 90 | 90 | | 17.6 | .837 | 7.57 | -90 | 2.61 | 60.1 | |
| 10:42 | 5.38 | " | " | | 17.0 | .911 | 7.69 | -98 | 1.78 | 47.7 | |
| 10:47 | " | ↓ | ↓ | | 17.3 | .876 | 7.75 | -102 | 1.62 | 36.6 | |
| 10:52 | 5.39 | | | ↓ | 17.2 | .833 | 7.75 | -107 | 1.52 | 26.2 | |
| 10:57 | " | ↓ | ↓ | 2gal | 17.2 | .824 | 7.80 | -114 | 1.35 | | |
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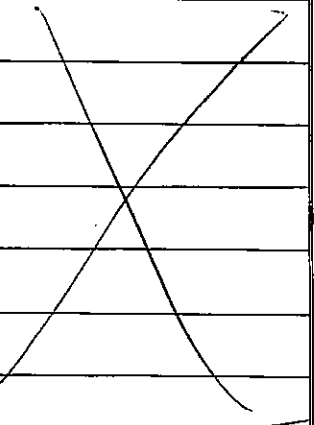


Notes:
None

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-30 Collection Time 11:50

Sampling Sequence: 13 of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 90°, P.C.

Depth To Product: ND Feet Depth To Water: 5.01 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.2 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.60

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*–USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS–*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-30
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Screen (Below RP): Top N/A Bottom 10.60
Pump Intake Depth: 7.75
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:15 | 5.18 | 60 | 60 | | 18.9 | .536 | 7.93 | 4 | 9.02 | 125.0 | |
| 11:20 | 5.16 | 60 | 60 | | 17.9 | .512 | 7.77 | -21 | 4.03 | 38.2 | |
| 11:25 | " | " | " | | 17.6 | .641 | 7.76 | -37 | 2.85 | 25.1 | |
| 11:30 | " | " | " | | 17.7 | .671 | 7.80 | -45 | 2.45 | 26.1 | |
| 11:35 | " | " | " | | 17.4 | .691 | 7.79 | -52 | 2.02 | 23.1 | |
| 11:40 | 5.17 | ↓ | ↓ | ↓ | 17.3 | .706 | 7.79 | -60 | 1.69 | 17.5 | |
| 11:45 | 5.17 | | ↓ | 2gal | 17.3 | .720 | 7.79 | -62 | 1.55 | 10.1 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW8 Collection Time 12:10

Sampling Sequence: 14 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 85°F

Depth To Product: ND Feet Depth To Water: 5.86 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): +3.00 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 14.66

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW8
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 14.66 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 10'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:35 | 5.86 | 60 | 60 | 0.10 | 20.36 | 1.27 | 6.48 | -98 | 4.64 | 271 | |
| 11:40 | 5.86 | | | | 17.14 | 1.30 | 6.48 | -81 | 3.19 | 133 | |
| 11:45 | 5.86 | | | | 17.10 | 1.30 | 6.49 | -103 | 2.65 | 116 | |
| 11:50 | 5.86 | | | | 17.02 | 1.29 | 6.51 | -113 | 2.06 | 109 | |
| 11:55 | 5.86 | | | | 17.15 | 1.29 | 6.51 | -117 | 1.82 | 146 | |
| 12:00 | 5.86 | | | | 16.68 | 1.29 | 6.50 | -118 | 1.79 | 157 | |
| 12:05 | 5.86 | | | | 16.67 | 1.29 | 6.52 | -121 | 1.69 | 120 | |
| 12:10 | 5.86 | | | 1.75 | 16.50 | 1.29 | 6.52 | -122 | 1.65 | 108 | Sample taken |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-29 Collection Time 12:40

Sampling Sequence: 15 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 80°, P. C.

Depth To Product: ND Feet Depth To Water: 4.78 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.3 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.00

Well Yield: High____ Low ✓ Pumped Dry? ____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy____ Opaque____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-29
Field Personnel: KK
Reference Point (RP – TOC or other-describe): TOC

Depth To Screen (Below RP): N/A (Top) / 11.00 (Bottom)
Pump Intake Depth: 7.75
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | 4.76 | 120 | 120 | | 20.4 | .500 | 7.91 | -24 | 8.92 | 24.2 | |
| 12:05 | 4.77 | | | | 19.4 | .521 | 7.66 | 3 | 2.60 | 12.9 | |
| 12:10 | " | | | | 19.3 | .584 | 7.64 | -2 | 1.49 | 4.0 | |
| 12:15 | " | | | | 18.7 | .622 | 7.63 | -15 | 1.18 | 1.8 | |
| 12:20 | " | | | | " | .638 | " | -19 | 1.11 | 2.3 | |
| 12:25 | " | | | | " | .664 | " | -27 | .98 | 4.0 | |
| 12:30 | 4.78 | | | | 18.8 | .670 | " | -31 | .80 | 3.4 | |
| 12:35 | " | | | 2.5 gal | 18.9 | .694 | " | -34 | .74 | 4.6 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-101 Collection Time 13:10

Sampling Sequence: 16 Of 18

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 85°F Short Rain Event

Depth To Product: ND Feet Depth To Water: 4.81 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 10.88

Well Yield: High ✓ Low _____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy _____ Opaque _____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: None

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-101
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To NA / 10.88 Of Screen (Below RP)
Top ' Bottom
Pump Intake Depth: 7.5'
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Liters | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:35 | 4.81 | 60 | 60 | 0.10 | 17.82 | 1.01 | 6.53 | -2 | 5.71 | 298 | |
| 12:40 | 4.82 | | | | 17.18 | 1.04 | 6.48 | -7 | 3.00 | 273 | |
| 12:45 | 4.82 | | | | 16.61 | 1.13 | 6.43 | -29 | 2.34 | 266 | |
| 12:50 | 4.82 | | | | 16.55 | 1.19 | 6.45 | -46 | 2.04 | 276 | |
| 12:55 | 4.82 | | | | 16.25 | 1.20 | 6.46 | -53 | 1.85 | 406 | |
| 13:00 | 4.82 | | | | 16.38 | 1.23 | 6.47 | -56 | 1.75 | 300 | |
| 13:05 | 4.82 | | | | 15.99 | 1.22 | 6.48 | -56 | 1.69 | 242 | |
| 13:10 | 4.81 | | | 1.80 | 16.09 | 1.23 | 6.49 | -58 | 6.66 | 178 | Sample taken |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
None

Last Update: Sep 2005

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-2 Collection Time 13:22

Sampling Sequence: 17 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 70°, P.C.

Depth To Product: N/D Feet Depth To Water: 4.80 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -.1 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 11.04

Well Yield: High_____ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear ✓ Cloudy_____ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: odor

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-2
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: N/A
Depth To Bottom: 11.04
Of Screen (Below RP)
Pump Intake Depth: 8.0'
Pumping Device: GeoPump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:55 | 4.84 | 120 | 120 | | 16.5 | 1.32 | 7.92 | 61 | 6.61 | 32.6 | |
| 13:00 | 5.05 | | | | 16.9 | 1.23 | 7.77 | -8 | 1.31 | 31.4 | |
| 13:05 | 5.02 | | | | 16.1 | 1.10 | 7.76 | -77 | 0.80 | 22.4 | |
| 13:10 | 5.01 | | | | 16.1 | 1.09 | 7.76 | -98 | 0.53 | 9.0 | |
| 13:15 | " | | | | 16.0 | 1.13 | " | -100 | .53 | 8.1 | |
| 13:20 | " | | | 2gal | " | 1.19 | 7.74 | " | .40 | 5.9 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
~~Black~~ odor

Last Update: Sep 2005

**ECS Well Sampling Form – Page 1 of 2**

Site Name/Location: N. Petroleum Date: 7/18/06

Sample I.D.: MW-1R Collection Time 14:12

Sampling Sequence: 16 Of 18

EC S Field Staff Collecting This Sample: KR

Climatic Conditions (Temp/Precip): 80°, P.C.

Depth To Product: ND Feet Depth To Water: 4.85 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): 0 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND / IP

Total Depth Of Boring (Take Measurement After Sampling): 12.24

Well Yield: High_____ Low ✓ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy ✓ Opaque_____

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): VT 8021B

Field Test Results (HACH Kits):

Alkalinity: N/A Chloride: N/A

Iron (II): N/A Sulfate: N/A

Notes: Slight odor, no cap

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW-1R
Field Personnel: KR
Reference Point (RP – TOC or other-describe): TOC

Depth To N/A / 12.24' Of Screen (Below RP)
Top 8.5' Bottom
Pump Intake Depth:
Pumping Device: Geopump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed | Cumulative Volume Purged | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13:35 | 5.18 | 90 | 90 | | 17.4 | ~~1.43~~ | 7.57 | 22 | 7.24 | 134.0 | |
| 13:40 | 5.33 | 60 | 60 | | 17.1 | 1.37 | 7.44 | 26 | 1.68 | 90.7 | |
| 13:45 | 5.20 | | | | 17.8 | 1.31 | 7.48 | 35 | 1.05 | 67.4 | |
| 13:50 | 5.21 | | | | 17.5 | 1.28 | 7.50 | 45 | ~~.90~~ | 152.0 | |
| 13:55 | " | | | | 17.6 | 1.24 | 7.54 | 54 | .90 | 131.0 | |
| 14:00 | 5.21 | | | | 17.4 | 1.24 | 7.55 | 62 | 0.98 | 108.0 | |
| 14:05 | " | | | | 17.3 | 1.25 | 7.55 | 66 | 0.96 | 98.8 | |
| 14:10 | " | ↓ | ↓ | | 17.2 | 1.24 | 7.56 | 69 | 0.95 | 88.0 | Sample |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
No Cap, Slight odor

Last Update: Sep 2005

7/24/06 Northern Petroleum

08-204262 70°F

10:00 onsite JG

Bail Down Test

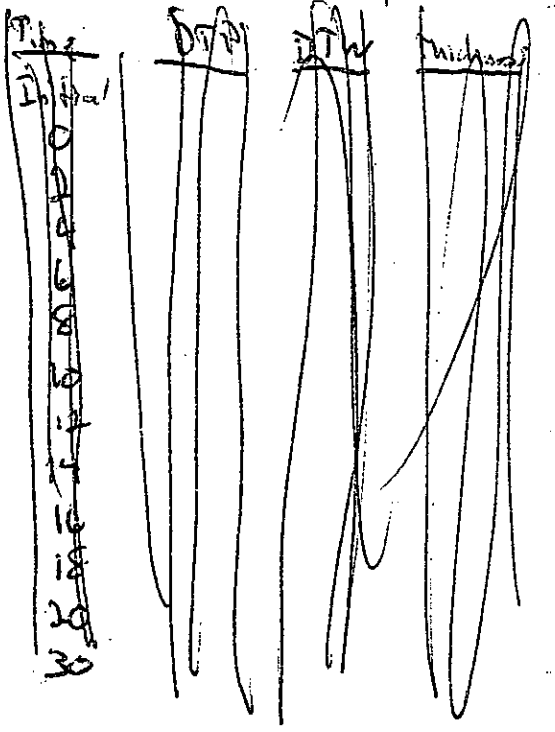
~ 20 ml Product removed

MW-22

| Time | | DTP | DTW | Thickness |
|---|---|---|---|---|
| Initial | | 4.76 | 4.99 | 0.23 |
| 10:44 | 0 | 4.79 | 4.81 | 0.02 |
| 10:46 | 2 | 4.79 | 4.82 | 0.03 |
| | 4 | 4.79 | 4.85 | 0.06 |
| 10:50 | 6 | 4.79 | 4.85 | 0.06 |
| | 8 | 4.79 | 4.84 | 0.05 |
| | 10 | 4.79 | 4.84 | 0.05 |
| | 12 | 4.80 | 4.84 | 0.04 |
| | 14 | 4.80 | 4.84 | 0.04 |
| 11:00 | 16 | 4.79 | 4.84 | 0.05 |
| | 18 | 4.79 | 4.84 | 0.05 |
| | 20 | 4.79 | 4.84 | 0.05 |
| 11:14 | 30 | 4.79 | 4.84 | 0.05 |

MW-19 - No Detect with IP
MW-17 - No Detect with IP

* MW-28 Bail Down Test — ND with IP




- above ground casing with no cap

* MW-28 - No Detect with IP.
- There was an odor but no product was on end of probe
(apparent)



MW-7 Bail Down Test ~ 15 ml. Product removed

| Time | | DTP | DTW | Thickness |
|---|---|---|---|---|
| Initial | | 5.68 | 5.81 | 0.13 |
| 11:48 | 0 | 5.70 | 5.73 | 0.03 |
| 11:50 | 2 | 5.69 | 5.74 | 0.05 |
| | 4 | 5.70 | 5.75 | 0.05 |
| | 6 | 5.69 | 5.75 | 0.06 |
| | 8 | 5.69 | 5.75 | 0.06 |
| | 10 | 5.69 | 5.76 | 0.07 |
| 12:00 | 12 | 5.69 | 5.75 | 0.06 |
| | 14 | 5.69 | 5.75 | 0.06 |
| | 16 | 5.69 | 5.75 | 0.06 |
| | 18 | 5.69 | 5.75 | 0.06 |
| 12:08 | 20 | 5.69 | 5.76 | 0.07 |
| 12:18 | 30 | 5.69 | 5.75 | 0.06 |

12:30 offsite JG.

7/31/06 Northern Petroleum
08-20426 2 75°F

10:45 onsite J.G.
-could not locate MW4, MW11
Possibly under 2 AST's beside berm

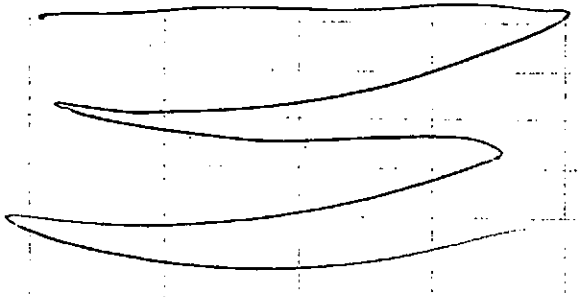
12:00 Calibrate Horiba

| pH | Cond | Turb | D.O |
|---|---|---|---|
| 3.89 | 4.44 | 0 | 7.59 |

- MW12 had free product so a bail Down test was done instead of low flow sampling.

MW19 DTW → 4.72 (WD with IP)
~~odor~~ odor from well

17:15 Offsite J.G.



Bail Down Test

MW-12 removed ~40 ml. of Product

| Time | DTP | DTW |
|---|---|---|
| Initial | 3.88 | 4.08 |
| 12:28 | 3.90 | 3.94 |
| 12:39 | 3.88 | 3.99 |
| 12:42 | 3.88 | 4.01 |
| 12:45 | 3.88 | 4.01 |
| 12:47 | 3.88 | 4.01 |
| 12:51 | 3.88 | 4.01 |
| 12:53 | 3.88 | 4.01 |
| 12:55 | 3.88 | 4.01 |
| 12:58 | 3.88 | 4.01 |
| 13:50 | 3.88 | 4.01 |

MW 22 recovered ~10 ml of Product

| Time | DTP | DTW |
|---|---|---|
| Initial 14:07 | 4.69 | 4.82 |
| 14:11 | 4.71 | 4.76 |
| 14:15 | 4.69 | 4.78 |
| 14:18 | 4.69 | 4.78 |
| 14:20 | 4.69 | 4.78 |
| 14:22 | 4.69 | 4.79 |
| 14:24 | 4.69 | 4.79 |
| 14:26 | 4.69 | 4.79 |
| 14:46 | 4.69 | 4.78 |
| 15:17 | 4.70 | 4.79 |

MW7 (~5 ml Product removed)

| Time | DTP | DTW |
|---|---|---|
| 15:35 | 5.60 | 5.63 |
| 15:46 | 5.61 | 5.62 |
| 15:49 | 5.61 | 5.63 |
| 15:51 | 5.61 | 5.63 |
| 15:54 | 5.61 | 5.63 |
| 15:56 | 5.61 | 5.63 |
| 15:59 | 5.61 | 5.64 |
| 16:01 | 5.61 | 5.63 |
| 16:03 | 5.61 | 5.63 |
| 16:05 | 5.61 | 5.63 |
| 16:42 | 5.62 | 5.64 |

MW28 (~ removed)

| Time | DTP | DTW |
|---|---|---|
| 16:10 | 6.78 | 6.94 |
| 16:18 | 6.92 | 6.93 |
| 16:20 | 6.90 | 6.91 |
| 16:22 | 6.88 | 6.90 |
| 16:25 | 6.88 | 6.96 |
| 16:27 | 6.86 | 7.00 |
| 16:29 | 6.85 | 7.02 |
| 16:31 | 6.85 | 7.02 |
| 16:33 | 6.88 | 7.03 |
| 16:35 | 6.88 | 7.04 |
| 17:11 | 6.86 | 7.09 |

Cap was off when arrived. I put it back on at end of day. This is an above ground casing so rain past few days could get in.

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum Date: 7/31/06

Sample I.D.: MW-17 Collection Time 13:40

Sampling Sequence: 1 Of 2

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 75° F

Depth To Product: ND Feet Depth To Water: 4.75 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.10 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 11.13

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021b VTsrun

Field Test Results (HACH Kits):

Alkalinity: NA Chloride: NA

Iron (II): NA Sulfate: NA

Notes:

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

## Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: ~~MW~~ MW 17
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To N/A / 11.13 Of Screen (Below RP)
Top Bottom
Pump Intake Depth: 8.00'
Pumping Device: Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min) | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13:10 | 4.75 | 200 | 200 | 0.50 | 15.00 | 2.52 | 7.19 | -132 | 11.80 | 0 | Slight odor |
| 13:15 | 4.75 | ↓ | ↓ | ↓ | 14.70 | 2.40 | 7.29 | -135 | 8.80 | 306 | Sheen on purge |
| 13:20 | 4.75 | ↓ | ↓ | ↓ | 14.4 | 2.32 | 7.39 | -137 | 6.56 | 79 | |
| 13:25 | 4.75 | ↓ | ↓ | ↓ | 14.3 | 2.26 | 7.46 | -139 | 5.50 | 38 | |
| 13:30 | 4.75 | ↓ | ↓ | ↓ | 14.3 | 2.20 | 7.56 | -142 | 4.75 | 29 | |
| 13:35 | 4.75 | ↓ | ↓ | ↓ | 14.2 | 2.19 | 7.63 | -142 | 4.55 | 35 | |
| 13:40 | 4.75 | ↓ | ↓ | 3.00 | 14.2 | 2.17 | 7.69 | -143 | 4.29 | 53 | Sampled |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
No cap on casing

## ECS Well Sampling Form – Page 1 of 2

Site Name/Location: N. Petroleum St. Johnsbury Date: 7/31/06

Sample I.D.: MW 18 Collection Time 15:05

Sampling Sequence: 2 Of 2

EC S Field Staff Collecting This Sample: JG

Climatic Conditions (Temp/Precip): 75° F

Depth To Product: ND Feet Depth To Water: 4.73 Feet

Reference Point (TOC or other -Describe) TOC

Ref. Point Elev. Relative To Ground Surface (Use "+" For Aboveground, "–" For Belowground): -0.15 feet

Measurement Technique (WLM, IP or other -Describe) IP

Presence/Absence Of NAPL And Detection Method: ND IP

Total Depth Of Boring (Take Measurement After Sampling): 10.88

Well Yield: High_____ Low_____ Pumped Dry? _____

Final Water Appearance (At Sample Collection) Clear_____ Cloudy_____ Opaque ✓

Sample Collected from (tubing, bailer, or other-describe) Tubing

Submitted For Analysis By (Method or Methods): 8021B VTscan

Field Test Results (HACH Kits):

Alkalinity: NA Chloride: NA

Iron (II): NA Sulfate: NA

Notes:

*--USE REVERSE SIDE OF FORM FOR LOW FLOW SAMPLING PARAMETERS--*

# Low-Flow Well Sampling Form – Page 2 of 2

Location: N. Petroleum
Well Id: MW 18
Field Personnel: JG
Reference Point (RP – TOC or other-describe): TOC

Depth To Top: NA / Depth To Bottom: 10.88 Of Screen (Below RP)
Pump Intake Depth: 7.5'
Pumping Device: Peristaltic Pump

| Time (24 Hr) | Depth To Water (ft) | Purge Rate mL/min | Pump Speed RPM | Cumulative Volume Purged Gallons | Temperature °C | Specific Conductance (uS/cm) | pH | ORP / eH (mV) | DO (Mg/L) | Turbidity (NTU) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14:40 | 4.73 | 140 | 140 | 0.10 | 15.3 | 2.73 | 7.59 | -112 | 10.04 | 340 | Moderate Odor |
| 14:45 | 4.73 | ↓ | ↓ | ↓ | 15.0 | 2.67 | 7.64 | -114 | 5.97 | 79 | Sheen on Purge |
| 14:50 | 4.73 | | | | 15.1 | 2.62 | 7.68 | -116 | 4.55 | 47 | |
| 14:55 | 4.73 | | | | 15.1 | 2.59 | 7.74 | -119 | 3.85 | 33 | |
| 15:00 | 4.73 | | | ↓ | 15.0 | 2.56 | 7.80 | -122 | 3.52 | 24 | |
| 15:05 | 4.73 | ↓ | ↓ | 2.00 | 15.8 | 2.53 | 7.85 | -124 | 3.19 | 8 | Samples Taken |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Notes:
NO Cap on casing

Last Update: Sep 2005

8/7/06 W. Petroleum in St. Johnsbury

08-204262 72°F

9:30 Onsite JG.

MW7 Bail Down Testing

Removed ~ 5ml

| | Time | DTP | DTW | Casing |
|---|---|---|---|---|
| Initial | 9:33 | 5.49 | 5.50 | Clear |
| | 9:40 | ND | 5.50 | Clear |
| | 9:42 | 5.495 | 5.50 | Clear |
| | 9:44 | 5.495 | 5.50 | Clear |
| | 9:46 | 5.495 | 5.50 | Slight Sheen |
| | 9:48 | ND | 5.49 | Sheen |
| | 9:50 | ND | 5.49 | |
| | 9:52 | 5.495 | 5.50 | |
| | 9:54 | 5.495 | 5.50 | |
| | 9:56 | ND | 5.49 | |
| | 9:58 | ND | 5.49 | |
| | 10:00 | ND | 5.50 | |
| | 11:27 | ND | 5.50 | |

| | | | Time |
|---|---|---|---|
| MW17 | DTW → 4.59 | no odor | 10:10 |
| MW19 | DTW → 4.61 | no odor | 10:14 |

MW-22 Bail Down Test

| Time | DTP | DTW |
|---|---|---|
| Initial 10:16 | 4.37 | 5.82 |
| 10:22 | 4.61 | 4.69 |
| 10:24 | 4.59 | 4.73 |
| 10:26 | 4.59 | 4.74 |
| 10.28 | 4.59 | 4.75 |
| 10.30 | 4.59 | 4.76 |
| 10:32 | 4.59 | 4.76 |
| 10:34 | 4.59 | 4.76 |
| 10:36 | 4.59 | 4.76 |
| 10:38 | 4.59 | 4.76 |
| 10:40 | 4.59 | 4.76 |
| 10:42 | 4.59 | 4.76 |
| 11.32 | 4.58 | 4.74 |

Strong Odor
removed ~200 ml of Product

MW28 Bail Down Test

| Time | DTP | DTW |
|---|---|---|
| Initial 10:50 | 6.68 | 7.03 |
| 10:58 | 6.85 | 6.86 |
| 11:00 | 6.81 | 6.95 |
| 11:02 | 6.83 | 6.92 |
| 11:04 | 6.81 | 6.95 |
| 11:06 | 6.81 | 6.95 |
| 11:08 | 6.83 | 6.93 |
| 11:10 | 6.82 | 6.90 |
| 11:12 | 6.81 | 6.93 |
| 11:14 | 6.81 | 6.91 |
| 11:16 | 6.81 | 6.96 |
| 11:18 | 6.81 | 6.88 |
| 12:12 | 6.75 | 6.77 |

- Product appeared frothy/bubbly as if air was being blown into well
- Strong Odor
- removed ~30 ml of Product

12:30 offsite JG

# APPENDIX C
# BAILDOWN TEST DATA & ANALYSIS

MW-7 Results of Product Bail-Down Test
Northern Petroleum in St. Johnsbury, VT

7/18/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 5.62 | 5.75 | 0.13 | initial |
| 1 | 5.65 | 5.74 | 0.09 | 0 |
| 2 | 5.64 | 5.71 | 0.07 | 2 |
| 4 | 5.63 | 5.71 | 0.08 | 4 |
| 6 | 5.64 | 5.74 | 0.10 | 6 |
| 8 | 5.64 | 5.77 | 0.13 | 8 |
| 10 | 5.64 | 5.76 | 0.12 | 10 |
| 12 | 5.64 | 5.74 | 0.10 | 12 |
| 14 | 5.64 | 5.74 | 0.10 | 14 |
| 16 | 5.64 | 5.77 | 0.13 | 16 |
| 18 | 5.64 | 5.77 | 0.13 | 18 |
| 20 | 5.63 | 5.77 | 0.14 | 20 |
| 30 | 5.64 | 5.67 | 0.03 | 30 |

7/24/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 5.68 | 5.81 | 0.13 | initial |
| 1 | 5.70 | 5.73 | 0.03 | 0 |
| 2 | 5.69 | 5.74 | 0.05 | 2 |
| 4 | 5.70 | 5.75 | 0.05 | 4 |
| 6 | 5.69 | 5.75 | 0.06 | 6 |
| 8 | 5.69 | 5.75 | 0.06 | 8 |
| 10 | 5.69 | 5.76 | 0.07 | 10 |
| 12 | 5.69 | 5.75 | 0.06 | 12 |
| 14 | 5.69 | 5.75 | 0.06 | 14 |
| 16 | 5.69 | 5.75 | 0.06 | 16 |
| 18 | 5.69 | 5.75 | 0.06 | 18 |
| 20 | 5.69 | 5.76 | 0.07 | 20 |
| 30 | 5.69 | 5.75 | 0.06 | 30 |

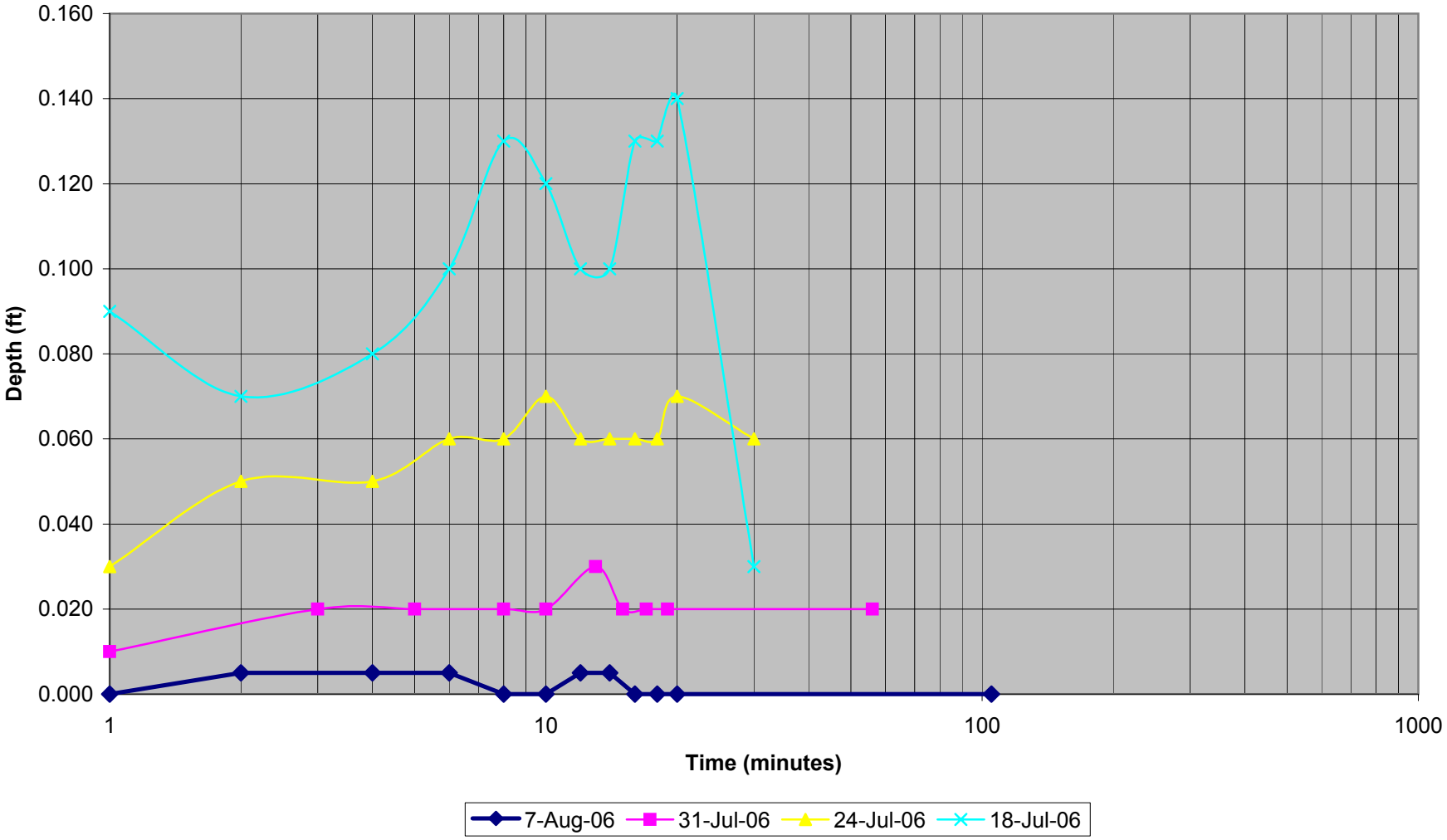
7/31/2006

| Time (min) | DTP | DTW | Thickness | thick time |
|---|---|---|---|---|
| 1 | 5.60 | 5.63 | 0.03 | initial |
| 1 | 5.61 | 5.62 | 0.01 | 0 |
| 3 | 5.61 | 5.63 | 0.02 | 3 |
| 5 | 5.61 | 5.63 | 0.02 | 5 |
| 8 | 5.61 | 5.63 | 0.02 | 8 |
| 10 | 5.61 | 5.63 | 0.02 | 10 |
| 13 | 5.61 | 5.64 | 0.03 | 13 |
| 15 | 5.61 | 5.63 | 0.02 | 15 |
| 17 | 5.61 | 5.63 | 0.02 | 17 |
| 19 | 5.61 | 5.63 | 0.02 | 19 |
| 56 | 5.62 | 5.64 | 0.02 | 56 |

8/7/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 5.49 | 5.50 | 0.01 | initial |
| 1 | ND | 5.50 | 0.00 | 0 |
| 2 | 5.495 | 5.50 | 0.005 | 2 |
| 4 | 5.495 | 5.50 | 0.005 | 4 |
| 6 | 5.495 | 5.50 | 0.005 | 6 |
| 8 | ND | 5.49 | 0.00 | 8 |
| 10 | ND | 5.49 | 0.00 | 10 |
| 12 | 5.495 | 5.50 | 0.005 | 12 |
| 14 | 5.495 | 5.50 | 0.005 | 14 |
| 16 | ND | 5.49 | 0.00 | 16 |
| 18 | ND | 5.49 | 0.00 | 18 |
| 20 | ND | 5.50 | 0.00 | 20 |
| 105 | ND | 5.50 | 0.00 | 105 |

**MW-7 Results of Product Bail-Down Test**
**Northern Petroleum**
**St. Johnsbury, VT**

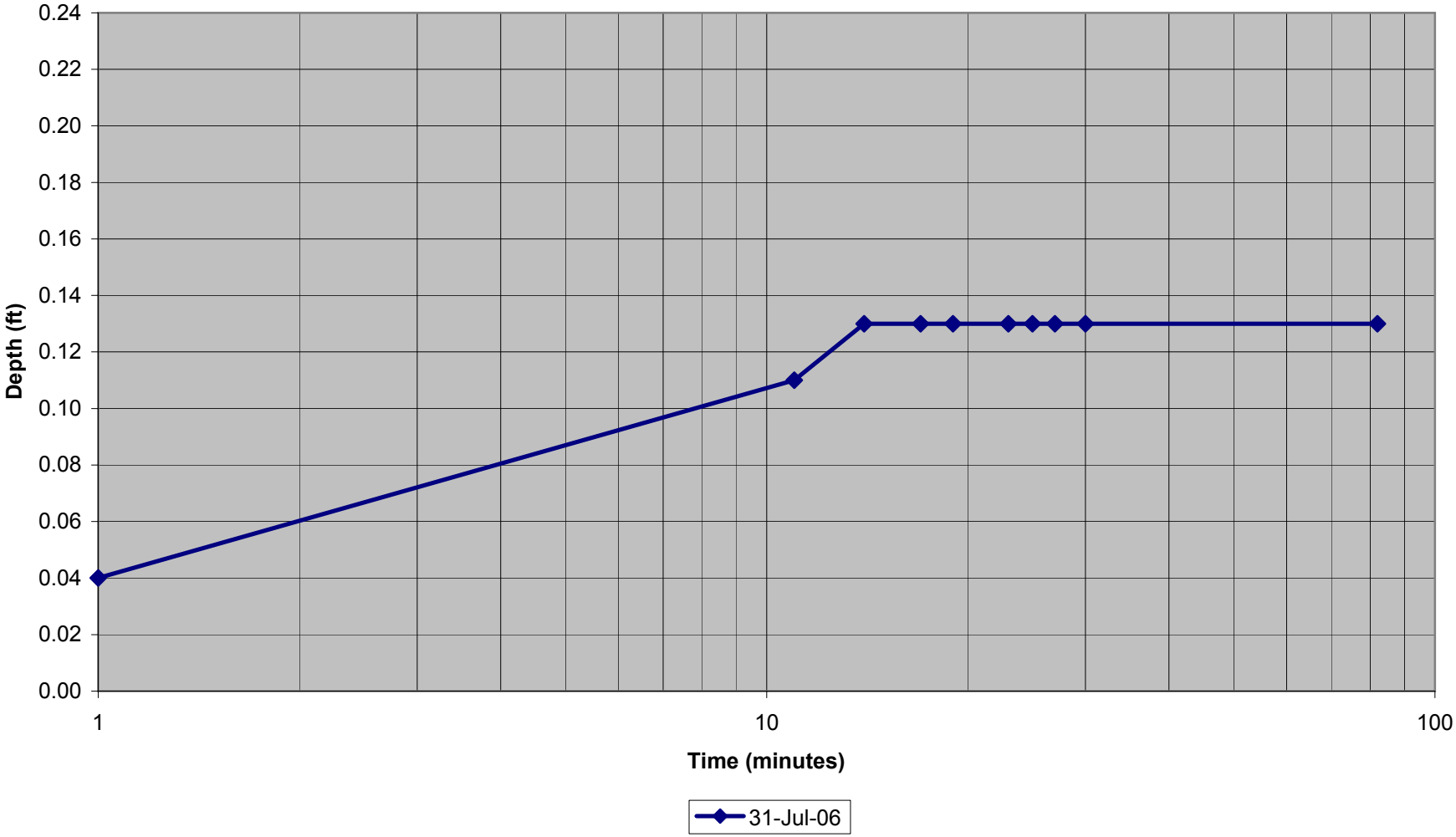


MW-12 Results of Product Bail Down Test
Northern Petroleum in St. Johnsbury, VT

7/31/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 3.88 | 4.08 | 0.20 | initial |
| 1 | 3.90 | 3.94 | 0.04 | 0 |
| 11 | 3.88 | 3.99 | 0.11 | 11 |
| 14 | 3.88 | 4.01 | 0.13 | 14 |
| 17 | 3.88 | 4.01 | 0.13 | 17 |
| 19 | 3.88 | 4.01 | 0.13 | 19 |
| 23 | 3.88 | 4.01 | 0.13 | 23 |
| 25 | 3.88 | 4.01 | 0.13 | 25 |
| 27 | 3.88 | 4.01 | 0.13 | 27 |
| 30 | 3.88 | 4.01 | 0.13 | 30 |
| 82 | 3.88 | 4.01 | 0.13 | 82 |

**MW-12 Results of Product Bail-Down Test**
**Northern Petroleum**
**St. Johnsbury, VT**



MW-22 Results of Product Bail-Down Test
Northern Petroleum in St. Johnsbury, VT

7/17/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 4.43 | 5.79 | 1.36 | initial |
| 1 | 4.66 | 4.82 | 0.16 | 0 |
| 2 | 4.65 | 4.82 | 0.17 | 2 |
| 4 | 4.65 | 4.81 | 0.16 | 4 |
| 6 | 4.65 | 4.82 | 0.17 | 6 |
| 8 | 4.65 | 4.81 | 0.16 | 8 |
| 10 | 4.65 | 4.81 | 0.16 | 10 |
| 12 | 4.65 | 4.81 | 0.16 | 12 |
| 14 | 4.66 | 4.81 | 0.15 | 14 |
| 16 | 4.66 | 4.81 | 0.15 | 16 |
| 18 | 4.66 | 4.81 | 0.15 | 18 |
| 20 | 4.66 | 4.80 | 0.14 | 20 |
| 30 | 4.65 | 4.80 | 0.15 | 30 |

7/24/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 4.76 | 4.99 | 0.23 | initial |
| 1 | 4.79 | 4.81 | 0.02 | 0 |
| 2 | 4.79 | 4.82 | 0.03 | 2 |
| 4 | 4.79 | 4.85 | 0.06 | 4 |
| 6 | 4.79 | 4.85 | 0.06 | 6 |
| 8 | 4.79 | 4.84 | 0.05 | 8 |
| 10 | 4.79 | 4.84 | 0.05 | 10 |
| 12 | 4.80 | 4.84 | 0.04 | 12 |
| 14 | 4.80 | 4.84 | 0.04 | 14 |
| 16 | 4.79 | 4.84 | 0.05 | 16 |
| 18 | 4.79 | 4.84 | 0.05 | 18 |
| 20 | 4.79 | 4.84 | 0.05 | 20 |
| 30 | 4.79 | 4.84 | 0.05 | 30 |

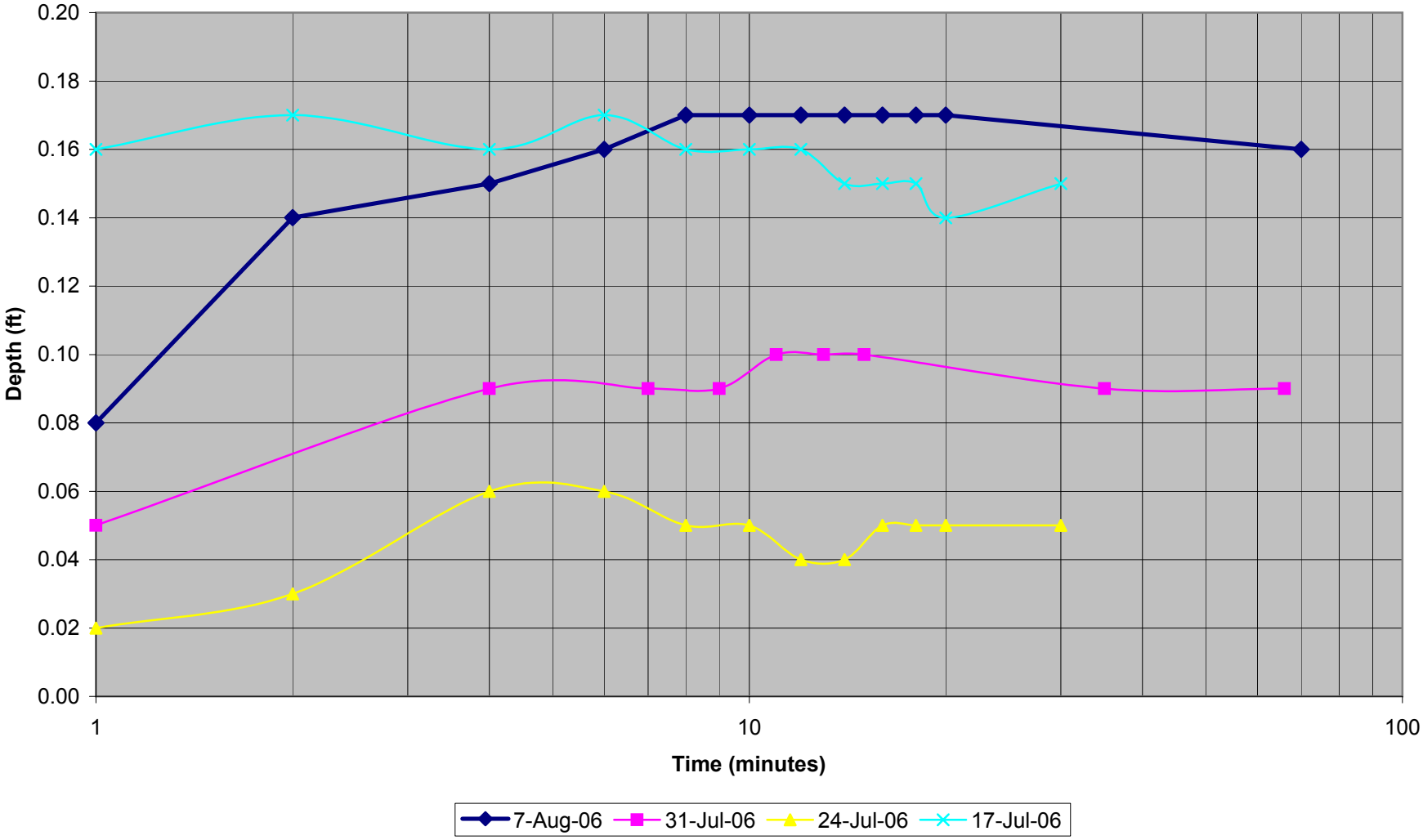
7/31/2006

| Time (min) | DTP | DTW | Thickness | thick time |
|---|---|---|---|---|
| 1 | 4.69 | 4.82 | 0.13 | initial |
| 1 | 4.71 | 4.76 | 0.05 | 0 |
| 4 | 4.69 | 4.78 | 0.09 | 4 |
| 7 | 4.69 | 4.78 | 0.09 | 7 |
| 9 | 4.69 | 4.78 | 0.09 | 9 |
| 11 | 4.69 | 4.79 | 0.10 | 11 |
| 13 | 4.69 | 4.79 | 0.10 | 13 |
| 15 | 4.69 | 4.79 | 0.10 | 15 |
| 35 | 4.69 | 4.78 | 0.09 | 35 |
| 66 | 4.70 | 4.79 | 0.09 | 66 |

8/7/2006

| Time (min) | DTP | DTW | Thickness | thick time |
|---|---|---|---|---|
| 1 | 4.37 | 5.82 | 1.45 | initial |
| 1 | 4.61 | 4.69 | 0.08 | 0 |
| 2 | 4.59 | 4.73 | 0.14 | 2 |
| 4 | 4.59 | 4.74 | 0.15 | 4 |
| 6 | 4.59 | 4.75 | 0.16 | 6 |
| 8 | 4.59 | 4.76 | 0.17 | 8 |
| 10 | 4.59 | 4.76 | 0.17 | 10 |
| 12 | 4.59 | 4.76 | 0.17 | 12 |
| 14 | 4.59 | 4.76 | 0.17 | 14 |
| 16 | 4.59 | 4.76 | 0.17 | 16 |
| 18 | 4.59 | 4.76 | 0.17 | 18 |
| 20 | 4.59 | 4.76 | 0.17 | 20 |
| 70 | 4.58 | 4.74 | 0.16 | 70 |

**MW-22 Results of Product Bail-Down Test**
**Northern Petroleum**
**St. Johnsbury, VT**



MW-28 Results of Product Bail-Down Test
Northern Petroleum in St. Johnsbury, VT

7/17/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 6.92 | 7.56 | 0.64 | initial |
| 1 | 6.99 | 7.09 | 0.10 | 0 |
| 2 | 6.98 | 7.09 | 0.11 | 2 |
| 4 | 6.98 | 7.10 | 0.12 | 4 |
| 6 | 6.97 | 7.11 | 0.14 | 6 |
| 8 | 6.97 | 7.12 | 0.15 | 8 |
| 10 | 6.97 | 7.13 | 0.16 | 10 |
| 12 | 6.97 | 7.13 | 0.16 | 12 |
| 14 | 6.97 | 7.13 | 0.16 | 14 |
| 16 | 6.97 | 7.13 | 0.16 | 16 |
| 18 | 6.97 | 7.13 | 0.16 | 18 |
| 20 | 6.97 | 7.13 | 0.16 | 20 |
| 30 | 6.96 | 7.13 | 0.17 | 30 |

8/7/2006

| Time (min) | DTP | DTW | Thickness (ft) | thick time |
|---|---|---|---|---|
| 1 | 6.68 | 7.03 | 0.35 | initial |
| 1 | 6.85 | 6.86 | 0.01 | 0 |
| 2 | 6.81 | 6.95 | 0.14 | 2 |
| 4 | 6.83 | 6.92 | 0.09 | 4 |
| 6 | 6.81 | 6.95 | 0.14 | 6 |
| 8 | 6.81 | 6.95 | 0.14 | 8 |
| 10 | 6.83 | 6.93 | 0.10 | 10 |
| 12 | 6.82 | 6.90 | 0.08 | 12 |
| 14 | 6.81 | 6.93 | 0.12 | 14 |
| 16 | 6.81 | 6.91 | 0.10 | 16 |
| 18 | 6.81 | 6.96 | 0.15 | 18 |
| 20 | 6.81 | 6.88 | 0.07 | 20 |
| 74 | 6.75 | 6.77 | 0.02 | 74 |

7/31/2006

| Time (min) | DTP | DTW | Thickness | thick time |
|---|---|---|---|---|
| 1 | 6.78 | 6.94 | 0.16 | initial |
| 1 | 6.92 | 6.93 | 0.01 | 0 |
| 2 | 6.90 | 6.91 | 0.01 | 2 |
| 4 | 6.88 | 6.90 | 0.02 | 4 |
| 7 | 6.88 | 6.96 | 0.08 | 7 |
| 9 | 6.86 | 7.00 | 0.14 | 9 |
| 11 | 6.85 | 7.02 | 0.17 | 11 |
| 13 | 6.85 | 7.02 | 0.17 | 13 |
| 15 | 6.88 | 7.03 | 0.15 | 15 |
| 17 | 6.88 | 7.04 | 0.16 | 17 |
| 53 | 6.86 | 7.09 | 0.23 | 53 |

**MW-28 Results of Product Bail-Down Test**
**Northern Petroleum**
**St. Johnsbury, VT**